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MADRAS JOURNAL

OF

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I.—*First Report of Progress made in the Examination of the* MACKENZIE MSS., *with an Abstract Account of the Works examined.—By the Rev.* WILLIAM TAYLOR, *Member of the Madras Literary Society, &c.*

To the Secretary to the Asiatic Department, Madras Lit. Soc. and Auxiliary Royal Asiatic Society.

SIR,—1. I have now been engaged for two months in the work of examining, collating, and (as far as needful) restoring the Mackenzie Manuscripts confided to me by authority of Government, under date of 6th June last; and as, according to the tenor of the correspondence with the Literary Society on the subject, a report, by way of general abstract, is expected from me, I think it expedient, in place of one general report at the close, to divide it into sections, forwarding these from time to time, as may be found convenient. The effect will be to render the whole more conveniently readable; and to enable all who feel any interest in the subject, whether near or remote, to know how the work is proceeding; to form an estimate of probable results; and to judge as to the expediency, or otherwise, of full translations of such portions of the extensive collection as may be found really valuable.

2. I beg leave here to state that the principle which guided me, at the outset, was to select those books which were in the worst state for the earliest examination and restoration. Hence, the following abstract will not offer the best, or (with a few exceptions) those selected on account of superior value; but those requiring to be promptly rescued from a rapid progress to wards illegibility, or destruction. I purpose pointing out by the way, what I think to be of value; but the exact merits of the whole collection must not be judged of until the abstracting, or reporting, is completed. I have no doubt that matter will ap-

pear sufficient to offer really valuable materials for several volumes of translations, if judged expedient to be made; while other portions, not perhaps adapted to that object, may still be valuable as matter of record, and occasional reference, in furnishing notes and illustrations, on the general subjects of history, literature, mythology, and works of fiction or romance: of which last some curious specimens exist, though they come not properly within the scope of my researches.

3. It will appear by the following abstract that some papers and portions of papers are irrecoverably lost, either by fading of ink, or destruction of materials by insects. It was in some cases necessary first to submit portions to the work of restoration by a copyist, and then to make a laborious comparison, before any idea could be formed of the nature of what was so rescued. There are some books and papers not mentioned herein, but to be reported on hereafter, which are I fear irrecoverable, by any pains, or any process. I have also been sorry occasionally to find whole papers, and, in some cases, parts of papers, taken away or cut out, when, where, or by whom, it is impossible to say; but the result is much to injure the collection.

4. In the work of restoration it was my personal care to have the best record ink, and super-royal paper, provided; good copyists were employed, and the copying has been made by my direction, in a bold large-sized hand-writing; so that even some slight damage received at a remote period, will not render them illegible. The whole of Colonel Mackenzie's labours, if I mistake not, were within the years from 1801 to 1819; and if, during so short a period, the collection has so severely suffered, the need of pains for better preservation, for the future, appeared to me manifest. Hence I have so conducted, and intend still so to conduct, the process of restoration, as to feel assured that, after the lapse of a hundred years, the writing will be as legible,or nearly so, as at the present time.

5. I have the pleasure to transmit to you for inspection, the first folio volume* of restored MSS. which I trust will give satisfaction to the Committee of Papers, and I beg leave to add the request, that, with their and your sanction, this letter and the accompanying abstract, may be printed, for general information in the Journal of the Society.

I have the honor to be, Sir,

Your most obedient Servant,

Madras, *Sept.* 28, 1837. W. Taylor.

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* We are bound to say that this volume has been executed in a style and at a cost, highly creditable to the judgment and disinterestedness of Mr. Taylor.—Editor.

A :—TAMIL.

I—*Cónga désa Rajakal.*

Palm leaf MS.—No. 217.—Countermark 74.

There are two copies of this valuable Manuscript, both of which were read and compared together. The one was found to be an imperfect copy of the other, having besides a considerable chasm in the middle: the superior copy has also a short break in the passage relating to a change of *Vishnu Verrd'hana* of *Talcád* from the *Jaina* to the *Vaishnava* faith; there is also an omission of one or two names. In other respects the better manuscript is complete. The palm-leaves of this copy (and of the inferior one also) had suffered much from being eaten through by insects; in some places letters, in others, words, were eaten away: these, however, could be made out by a little attention; and to prevent further illegibility I directed the manuscript to be restored on paper, forming a valuable record.

Though the title indicates only a narrative of the ancient *Conga-desam* (being as it would appear the same with the modern Coimbatore country) yet the work contains distinct chapters, or sections, which might be regarded as distinct productions on the *Chola, Oyisála,* and *Vijayanágara* kingdoms, these kings having been successively conquerors of the *Conga* country. The first record of the country goes up nearly to the commencement of the Christian era, and narrates the rule of some chiefs down to the close of the ninth century, and the conquest of the country, about that time, by *Aditya Varma,* a *Chola* prince. Various matters are narrated in connexion with this dynasty, and some light is thrown on the *Pandya-desam,* such as the records of that kingdom would not own. The *Conga* country then seems to have come under the rule of the *Oyisalas,* whose capital was above the ghauts, in the Mysore country. These gave way before the *Rayers* of *Bisnagar.*

Both dynasties, of *Oyisalas* and *Rayers,* are given from the commencement. The record is brought down to a period subsequent to the transfer of the remains of the *Rayer* power to *Pennacóndai,* and concludes with narrating warlike operations in the Mysore country, with the siege and storming of Seringapatam, A. D. 1609-10, nearly two hundred years antecedent to a like event which made it, for a time, so famous. At that time it is said to have come into the possession of the *Raja Udiyar* of Mysore.

The manuscript is, for the most part, free from the mythological fable, which usually disfigures *Hindu* documents, and is well supported by dates; in general referred to inscriptions, which are mentioned; and many grants of land are specified, with such reference. On the whole this is one of the best, and most valuable manuscripts in the collection. A more full abstract is not here given, seeing that some time, since, I translated the whole; and intend to transmit a copy of it to the Bengal Asiatic Society, for insertion, if thought worthy by them of such distinction, in the transactions of that illustrious Society.

Professor Wilson's notice of this manuscript will be found in Des. Cat. vol. 1, p. 198.

BOOKS OF MANUSCRIPTS ON PAPER.

II—Book No. 12, countermark 766.

Section 1.—The universal deluge according to the account of the *Jaina* people in the *Chettupat* district.

The account was given by one named *Cavundésvarer.* There are some geographical details of the neighbourhood of the *Himalaya* mountains; with chronological definitions, dealing in magnificent periods of time, and narrating changes of those periods; bounds of *D'herma Candam,* and *Mle'chch'ha Candam*; the period of great heat, of fire-rain, previous to the deluge; then other kinds of showers, among them of sugar-cane-juice, of poison, quintessence of poison, by which means the earth sinks down depressed; then come showers of milk, nectar, water; and afterwards the earth becomes restored: grass, plants, shrubs, &c. re-appear; men also again inhabit the earth, who dwell on it, and increase. After forty thousand years, the *Menus* and *Chacravertis* are born, and continue to rule. Then comes a period of twenty crores of crores of years, at the close of which the seven kinds of showers, as before, introduce the *yuga praláya* or periodical deluge: certain other changes occur down to the year 2,480 of the *Cali-yuga,* corresponding with the year of the era of *Salivahana* 1739 (A. D. 1817, when possibly the account was given). After another 18,000 years, there will be extreme heat for 21,000 years, and then in the *D'herma Candam* only, the fire-showers falling, will be followed by the periodical deluge.

Note.—This short paper is in Tamil, strangely mingled with *Pracrit;* and the writing is so much faded, as to be with difficulty legible. It contains the most extravagant exaggerations, but illus-

trates obscure expressions in other manuscripts as to fire-showers; and may be taken generally for a confirmation of opinion, among the *Jainas,* substantially the same as to the leading fact of the deluge, with the opinions and records, concerning the same great event, by the *Brahmanical Hindus.*

Section 2.—Account of a raja of *Chenji* (Ginjee) who persecuted the *Jaina* people.

In the year of *Salivahana* 1400 (A. D. 1478-9) *Cávarai Vencatapati Nayak* ruled in Ginjee, over the *Tiruvadi* district near *Vridd'háchala.* Being a man of a low tribe, he demanded of the *Brahmans* who among them would give one of their daughters to him as a wife: they replied that if the *Jainas* would first give him a wife, they would themselves do the same. The *Brahmans* went to a famous *Jaina* in the *Dindivanam* district, who promised to give his daughter to the Chieftain; but instead of actually doing so, contrived to offer him a very cutting insult. The Chief, greatly incensed, issued an order to decapitate all the *Jainas* that could be met with. In consequence some *Jainas* emigrated, some adopted the *Saiva* religion, some were slain, and some dissembled, secretly following their own rites. In *Uppu Vélur* a disguised *Jaina* was taken at a pool of water while performing his evening ceremonies, in the *Jaina* method, and was sent to Ginjee; but as the Chief had just then a child born in his house, he pardoned the *Jaina.* This person after so narrow an escape vowed to devote himself to an ascetic life. With some preparatory studies he fulfilled his vow.

Another *Jaina* through fear, had emigrated towards the south, passing from place to place; till at length in a dream he was directed not to go any further away: immediately afterwards he heard of the approach of the Mahomedans towards his native place; he went to meet them, and advanced as far as Arcot, where he acquired land to cultivate. After sometime he sent for the before mentioned *Jaina* ascetic, and to prevent a strange religion being introduced, he located that person on his lands as a teacher and guide. Some time afterwards a *Brahman* named *Tattácháryar* set up a pillar at Conjeveram, and challenged any who might think proper to come and dispute with him. Hearing of this circumstance the aforesaid *Jaina* teacher, named *Vira-Chena-Acharya,* went thither, and overcame *Tattácháryar* in polemical dispute, upset the pillar, and returned to *Uppu Velur;* where he fell sick, and died. Subsequently the *Jaina* religion flourished greatly in that neigh-

bourhood; and *Tayamur Udaiyar* continued to extend, to persons of that persuasion, flattering distinctions and privileges.

Note.—This paper was more legible than the former one, but in some places difficult to be restored: it seems to contain a plain traditionary statement of matters not very remote; and, in the main, may possibly be depended on. Many *Jainas* live in the neighbourhood of Arçot, Vellore, and Conjeveram.

Section 3.—Account of the *Sanc'hya*, and other modes of religious credence.

In the early times during the reign of a son of *Bharata*, the *Muni Capila* performed penitential austerities after the *Jaina* (*Vaishnava*) mode. There is a defective *Pracrit-sloca*, or verse. Some notice follows of the foundation of the *Sanc'hya* school by *Capila*; notices of other persons with defective *slocas*; account of leaders of the *Jaina* system, and of their disputations with the followers of other opinions.

Remark.—This paper is in the same hand writing and mode of composition, as *section* 1, but the ink so much faded, as to leave the meaning prevailingly unintelligible. The attempt to read it, and by consequence to restore it, has been a failure. The information that, if otherwise, might have been obtained from it, we most probably possess from other sources.

Section 4.—Customs and manners of the *Jainas* in the *Chettupat* district.

This paper contains two parts here designated by the letters A and B.

A. The *Yethi Dherma* and *Sravana Dherma. a,* The *Yethi Dherma* is of ten kinds.

1. *Ard'hyavam,* to follow the right way, and teach it to others. 2. *Mard'hava,* to behave with reverence to superiors, and carefully to instruct disciples. 3. *Satyam,* invariably to speak the truth. 4. *Saujam,* mentally to renounce hatred, affection, or passion, and evil desire; and outwardly to act with purity. 5. *Tiyágam* to renounce all bad conduct. 6. *Cshama,* to bear patiently, like the earth, in time of trouble. 7. *Tapasu,* outward and inward, self-mortification. 8. *Brahmácharyam,* to relinquish all sexual attachment, even in word, or thought. 9. *Aginchanam,* to renounce the darkness of error, and to follow the

light of truth. 10. *Samyanam*, duly to celebrate all special periods, festivals, or the like.

b. The *Sravana Dherma* is of eleven kinds. 1. *Terisinigen*, one who relinquishes certain unclean kinds of food, with killing, lying, theft, and all anxious cares. 2. *Vritiken*, one who eats not at night, is faithful to his teacher, to his family, and to his religion; he is self-restrained, and keeps silence, and zealously renounces the use of all pleasant vegetables. 3. *Sámáthiken*, is one, who with the foregoing qualifications, renders homage to the Divine Being three times a day, morning, noon and evening. 4. *Proshópavásen*, one who fasts on certain days, so appointed to be observed. 5. *Sachitan-vrithen*, one who, with the foregoing dispositions, renounces certain kinds of food. 6. *Rattiri-bakhten*, one who observes mortification during the day only. 7. *Bramahmácharya*, one always occupied in contemplation of God. 8. *Anarampan* one who quits cultivation, and all other secular occupations. 9. *Aparigrahan*, one who renounces all kind of earthly gain. 10. *Anumati pinda-vrithen*, one who forbears to eat even that which he had prepared. 11. *Utishta-pinda-vrithen*, one who relinquishes dress, except for mere decency; he carries a pot, and lives in a wilderness.

B. The *Purva Carmam* and *Apara-Carmam*. *a*—The *Purva Carmam* is of 16 kinds; and relates to ceremonies preceding birth, attendant on it, or consequent thereto; with any particular ceremonies on special occasions during life.

b. The *Apara Carmam* is of twelve kinds; and relates to ceremonies consequent on death; the first being burning the body, and the others different rites appropriated to following days. The names only are given, without any explanation of the various ceremonies.

Note.—*Section* 4.—A. is in the Grant'ha-Sanscrit character, with a little *Jaina*-Tamil, towards the close. B. is *Jaina*-Tamil; though not very legible, the restoration has been effected. This section may have its use.

Remark.—In the *Srávana Dherma*, particularly, some resemblance appears to some peculiar and known tenets of the *Pythagorean* philosophy. *Pythagoras* is considered to have learned his system from the Gymnosophists of India, usually confounded with the *Brachmanes*; but the Sanscrit term answering to Gymnosophist is *Digambara*, usually understood to have belonged especially to the ancient votaries of *Budd'ha*, and from it the *Brahmans* of the south coined the corrupt term *Samanar*, to denote the shameless sect of the *Baudd'has* or *Jainas*. I think

that the tenets taught by *Pythagoras* were those of the Indian *Digambaras*, or primitive *Baudd'hists*; and throw out the conjecture as perhaps meriting attention.

Section 5.—Representation of the *Jainas* of the *Chettupat* district. A petition to Colonel Mackenzie, Surveyor General.

The *Jaina* system was established in the Peninsula from very early times, and had many fanes, with other buildings for sacred purposes, well endowed. The *Saiva* and *Vaishnava* systems arose in opposition; and the *Brahmans* of those classes, by their learning and magical arts, brought over the kings, or other rulers, to their mode of credence, followed up by persecutions of the *Jainas*; their champions in polemical discussion being first overcome by magical means, and afterwards destroyed. Some well disposed rulers, knowing these proceedings, protected the *Jainas*, and made allowances to their religious edifices. A *Jaina* king from the north, named *Yemasitala*, came to the *Dandacáranya* (the great peninsular forest), and clearing it, brought a large colony of people from the north. But *Kulottunga Chola*, and *Adóndai*, took the country, and by the counsel of the *Brahmans* many *Jaina* edifices were appropriated to the *Hindu* system of worship, and other edifices were destroyed. At a subsequent period, the conquerors relenting, five *Jaina* fanes, at places specified, were protected and endowed. *Vicrama-chola* especially made a free-grant of land to the village of *Chitambur;* copy of the inscription on stone, recording this grant, having been sent to Col. Mackenzie, with the petition. About six hundred years ago, *Yeda ta-rayer* and *Vishnuva-devarayer* gave 1400 pagodas as a free donation: the inscription commemorating this grant remains. About two hundred years ago, *Vencatapati-rayer* gave a free donation of one thousand pagodas; copy of the inscription, recording the grant, transmitted. The rulers of the *Carnataca* country gave donations. During the rule of the Mahomedans, as the *Brahmans* were their agents, these, without knowledge of their employers, resumed the whole of the grants with the exception of only 200 pagodas. Besides, Ibrahim Subadar fought with *Rayaji* of Arcot; and, taking possession of the whole, very unjustly left only 40 pagodas of the annual endowment. The *Jainas* complained to the Nabob (name not specified) who issued an order on the subject; but the messenger bringing the order was seized by the Subadar, and ill-treated. Terrified by this proceeding the *Jainas* made no more complaints; but committed their cause to God. When the British assumed the country,

they removed the distress which the *Jainas* had suffered, and conducted themselves with equity to all. The people generally were restored to their privileges; the Hindus were employed and favoured, and the *Saiva* and *Vaishnava* fanes protected, but about 160 fanes belonging to the *Jainas* were neglected. The *Chitambúr* fane, being ancient and distinguished, received some little notice, to the extent of 60 pagodas. Considering that the arrangement was made by servants of the Honorable Company, the *Jainas* were afraid to make any complaint. At length " as a child addresses its father" they took courage to address the Government, pointing out the alleged invidious distinguishing favours recorded to the *Saivas* and *Vaishnavas* above themselves, who were earlier established in *this* country (the *Tónda-mandalam).* As we (says the petition) do not desire much, we now enclose a list of actually necessary expenses for *Chitambur*, and other fanes.

Section 6.—Account of the *Jaina* fanes at *Chitambur* in the *Chettupat* district, with list of expenses.

The required expenditure referred to in the preceding article follows here, but as it relates to very trifling items, and to the supply of such articles as oil, incense, lights, and the like, it was not thought necessary to copy out this portion, which could be of no general interest.

The following queries come after the list of required expenses; and appear, as far as can be made out, to be enquiries given by Colonel Mackenzie to his agent named *Apávu :* some of the enquiries would seem to have been answered by the foregoing and other papers.

1. From the early times to the present, the statement of kings who ruled, requires to be made, either from written history, or from tradition.

2. Regulations of old and down to the present time, with the dates or periods of their authors, required; also their countries, towns, and eras are wanted. 3. Eight thousand *Munis* were killed at Madura: in what particular places, and at what times, did this event occur ? 4. As the *Jaina* system is asserted to be the original one, at what time and place did it begin ? 5. To what place in Ceylon were the *Baudd'has* first sent ? 6. It is said that the world was destroyed by a flood, and only *Satyavrata* preserved; what do the *Jaina* books mention on that point ? 7. What do the *Jainas* say of showers of fire, and of mud, destroying the earth ? 8. From what country did the *Ladas* and *Lebbis* come ? 9. The *Yethi-dherma*, and *Grihast'ha dherma*

(the rest illegible.)

Section 7.—Account of *Damara-päkam* in the Arcot district.

In the beginning of the era of *Saliváhana* this country (*Tondamandalam*) was governed by the *Curumbars,* who built forts, and *Kulottunga-chola,* hearing that they were bad people, came and conquered the land, which he gave to his posterity. After some time, in the days of *Vira-jambu-rayer,* one named *Vira-vasanta-rayer* acquired authority in this mud fort, and changed the name to *Vira-vasanta-puram,* building temples; which after some time decayed, together with his authority. In the time of *Achyuta-rayer* (of *Bisnagar*) an investigation was made by him, who had a car made, and a fane built to *Varada-raja,* with other similar matters. In the time of *Zalfecar Khán* the country went to ruin. In the time of the Nabob *Wallajah* this mud-fort was attended to: a *Killadar* and a revenue-court were fixed there. In the great disturbance, many people from the vicinity took refuge within it. The fort is fifteen cawnies in extent. There follows a list of the fanes or temples which are around it, together with sacred pools and porches.

Section 8.—Account of *Arzakiyachenan* and *Anjáta-candan,* who ruled in the fort of *Ayilam* in the Arcot district.

Anciently all this surrounding country was waste, the above mentioned persons came from the north, and built forts on the hills named *Cuthirai-tondi* and *Vaiyali-tondi,* with a town named *Arzagu-chenai,* having a palace therein, with a surrounding wall and gates; they also formed a lower fort, and an upper citadel. These chiefs extended their authority to some distance around, strengthened by fortified posts: and, being without fear of superiors, they began to molest the common people. Matters being thus, about three-hundred years ago "our *forefathers*" came from the district of *Sri sailam* in the north, to this country; from what cause is not known. By the permission of *Yommunar,* who built the fort of Vellore, they resided under his authority, and constructed a small military fort, becoming a check on the before-mentioned marauding chieftains. They formed five villages into one district, and protected the people. From that time, downwards, whether they held the land by *sarvamaniyam* (tax free) or by *artamaniyam* (half tax) *we* do not know. Subsequently from the time of *Sabdulla Khan,* they were accustomed to pay a small and easy tribute. From the time of *Rayaji's subah,* that easy taxation ceased, and a regular tribute to the full extent was paid. In the time of the Nabob, in consequence of the molestation of one named *Sila-nayaken* (supposed to be some predatory chief), we built a small fort of brick for pro-

tection, and gave a maintenance to the troops that kept it from the proceeds of the land.

After the assumption of the country by the Honorable Company, that allowance was discontinued, and the fort now only remains. We continue to cultivate the ground, and pay tribute to the Company, like others, sometimes by direct tax to Government, and sometimes by an intermediate lease to farmers. There are two old fanes, one *Saiva*, one *Vaishnava*, in the neighbourhood.—Some other unimportant details of fanes, sacred pools, &c. at the close of the document.

Remark—Compared with other papers, the opening portion of this section may throw a ray of light additional on the state of the Carnatic under the early Mahomedan, or else the *Vijayanägara*, government. The narrative implies its having been written down from the oral communication of villagers, apparently of the *Vellala*, or agricultural class: claiming by tradition a descent from persons who emigrated hither from *Sri-sailam* in the north.

Section 9.—An account of *Pundi* a *Jaina* fane in the Arnee district.

This is a shrine of *Arhat* of the *Jainas*, of great consequence. The paper commences with a poetical description of the paradise in the midst of which it was built. The occasion was the following. Two *Vedars* (of the tribe of wild hunters) one named *Irumban*, the other *Pandan*, came thither in order to dig up an edible kind of root. There was an ascetic who, like *Valmica*, was doing penance in a white-ant hill, when these hunters, in digging, struck him on the breast with their implement. The hunters afraid shaded the spot with branches, and daily brought to the ascetic, who was named *Tellu-mani-nathar*, offerings of honey, flour, fruits, and roots. After doing so for a long time, another *Muni* came thither named *Samaya-nathar*, on seeing whom the *Vedars* became almost lifeless through dread, but on his manifesting tokens of favour they recovered self-possession. The *Vedars* said to him "there is a god like to yourself in our quarter." The *Muni*, being rejoiced, bid them shew him where, which they speedily did with great reverence. Under his instructions the foundations of a shrine to *Arhat* were laid with the prescribed ceremonies. The two *Vedars* afterwards hastily ran away, taking with them their bows and arrows, to the *Rayer*, to whom they reported that they brought good news, which would remove his troubles. On the *Rayer* enquiring what it was, *Pundan* reminded him of a promise from him of giving even to the extent of half his dominions, if an evil-spirit which possessed his sister, and which had

destroyed all who attempted to exorcise it, could be cast out. While the man was speaking this spirit quitted the woman, who came forth dressed, a plate of flowers in her hand; with which she set out to visit the residence of the *Muni,* whose power had cured her. The *Rayer* and his family followed after, and, on coming to the place, they all paid homage to the sage. On the *Rayer* asking him what he demanded, he required that the begun temple should be properly finished, which the *Rayer* accordingly directed to be accomplished. The two *Vedars* had villages given them, which afterwards bore their respective names; and, when one of the *Munis* died, the other continued to reside in, or near, the shrine.

Note.—This paper, from the fading of the ink, caused great trouble in restoring particular passages, with a few failures in making out some words and letters. The general sense is however preserved, it is in poetical Tamil of the plainer sort, and merely the legend of a *Jaina* fane. The *Rayer's* name is not mentioned, nor any date. Accordingly the only use of the document is to illustrate native manners and the mode of the introduction of the *Jaina* system at a remote period. The tribe of *Vedars* (a pure Tamil word having no connexion with the Sanscrit word *Veda*) were not *Hindus*; but, according to indications in these papers, they were the earliest inhabitants of the Peninsula; giving way before the *Curumbars,* even as these also were superseded by the pure *Hindus.* In *Hindu* writings the term *Vedar* is synonimous with every thing low, vile, and contemptible, under a human form.

Section 10.—An account of a hillock of white-pebbles (fossil remains) at *Callapiliyur* in the district of *Chettupat.*

To the east of the above village there is a hillock, entirely of white stones. The hierophant of the fane in that village gave the following account of them. Two *Racshasas,* named *Vathen* and *Vil-Vathen,* lived here, and were accustomed to feast foot travellers in the following manner. *Vil-Vathen* first slew his younger brother *Vathen,* and then cooked him in pots, out of which he fed the traveller. The meal being finished *Vil-Vathen* called on his brother by name, who came forth alive, rending the bowels of the guest, who, dying in consequence, both of the savages feasted on his body. On the occasion of the marriage of *Saiva* and *Parvati,* at *Cailasa,* they dismissed *Agastya,* sending him to the mountain *Pothaiya* in the south; who, on the road, came by the

residence of these *Racshasas*, and was treated with great civility by *Vil-Vathen*, and the usual meal: on its being finished *Vil-Vathen* called his brother, and *Agastya*, penetrating the state of the case, took up the words, and added a word or two of Sanscrit, in consequence of which *mantra* the body of *Váthen* dissolved, and passed away without doing *Agastya* any mischief. He denounced a woe on *Vil-Vathen*, who died. The bones of these two *Racshasas* having fallen to pieces, and becoming petrified, are now termed white pebbles.

Remark.—Setting aside the ridiculous fable, a tradition like this implies that the *Hindus* designate savages by the term *Racshasas*; and that possibly (as Dr. Leyden has intimated) cannibalism was common in India, among the tribes supplanted by *Brahmanism* or *Baudd'hism.* The hillock itself, if really a fossil petrifaction, is an object of attention by the naturalist.*

Section II.—Account of the fane of *Tiruvapadi*, and of the ancient fort of *Adinarrayen Samb'huva Rayer*, at *Vayalur* in the *Chettupat* district.

In ancient times *Parasara rishi* (father of *Vyasa*), and *Marcandeya rishi*, retired for penance to this mountain, named *Su-darisanam. Vishnu* came thither to see them, and remained reposing on *Athisesha*; giving *mocsham* (or eternal happiness) to such as came to worship him there; these visitors being not men, but the inferior gods: they formed mountain-pools for bathing, which now make five cascades. The *tirt'hhas* (or pools) are designated by names; in one of them the footsteps of *Vishnu* are visible, by the marks left. A little to the east of this hill *Vira Narrayana Samb'huva Rayen* built a fort, governed the country, and made some charitable grants; fragments of buildings in brick-work indicate the site of this fort. His palace was on a hill at some distance westward, where also vestiges appear; there is also a *Vaishnava* fane; as only a few dwellings are in that place, it is now called *Vayalur* (a hamlet in the open fields). At the foot of the hill there was once a *Saiva* fane of which now only the emblem of *Saiva* remains. Under the hill are other antique vestiges; among them of a wide street with *Mantapas* (or porches) and other similar things,

* For an account of one of these hillocks see a subsequent article in this Journal.—Editor.

appendages to *Hindu* worship. In a former *yuga* (or age) the *Vanar* (*sylvans*) paid homage to *Rama*, the incarnation of *Vishnu* ; and when the latter returned to *Vaicont'ha*, he called for them ; some followed him ; and some remained, continuing, to the present day, in *Vaishnava* fanes to attend on the god. The black-faced species of apes especially abounds in this district.

This statement was written according to the account given by the *Nambiyan* (*Brahman*) of *Tiruvayipadi*, and of *Vencatesa muthaliar*.

Remark.—From an account like this we can extract nothing more than the certainty of some head town of a district having existed, under a chief, whose name elsewhere appears ; and who may have been among the chiefs arising out of the ruins of the ancient *Chola* dynasty.

Section 12.—An inscription on a slab at the entrance of a *Jaina* fane at *Turakal* in the district of *Vandivasi*.

The inscription commemorates the grant, by *Tirumucapa svasta sri Gcva-perun singhen*, of a *Pallichantam* (alms house) to the officiating hierophants, and their assistants. It has no date except the specification of *Carticeya* month (part of November). It is in Tamil mingled with *Pracrit*, in the usual *Jaina* manner, and does not appear to be complete, unless the sign (an abreviation) be intended to denote (&c.) by the copyist, as not having transcribed the whole, which seems to be not improbable.

A remark by *Apávu* (Colonel Mackenzie's servant). In *Turakal* there is a small hill on which there is a curious *Jaina* fane, and another one at the base ; in one place there is an image of fine workmanship ; and in another place four well sculptured images. In the latter there are three inscriptions, respectively in the Canarese, Tamil, and Sanscrit, of which the letters would require great pains to copy or decipher. There is the unfinished commencement of a sculptured cave, like those at *Mávalipuram* ; and several natural caves around the hill ; in three of which there are *Jaina* images, on seats (or pedestals). They say that *Jaina* ascetics lived in these caves; there was most probably a *Jaina sabha* (or assembly) here in former times. The description and account were obtained from *Loga-nátha-nayanàr.*

Section 13.—An account of Aragiri-hill, near the village of *Arungunram* in the Arcot district.

In the *Scánda-purana*, by *Veda-Vyása*, an account is given of a place three and a half *yojanas* (leagues of 10 miles each) west of *Conjeveram ;* where there was a celebrated fane endowed by many rajas, as *Kulottunga Chola*, and others.—Notice of festivals in the neighbourhood.—In the fanes of *Tirt'ha-nathar*, and *Cudapa-nathar*, are inscriptions of the year 1120 era of *Salivàhana*. On a large stone there is an inscription of the time of *Kulottunga Chola*, commemorating a treaty between *Jambu-rayen*, who ruled in the west country, the conqueror of the *Pandiya-king*, and *Raja Cesari varma*. There are besides many other inscriptions, commemorating grants by other persons. The Mahomedans broke up this fane, and used the materials in building Arcot. In the shrine of one of the emblems of *Saiva*, to the N. E., some offerings continue to be paid. There is a perpetual spring (fountain) near the place. In the era of *Saliváhana* 1122 one named *Chengeni-Vicrama-Rayer-Jambu-rayer*, built a fane to the (*grama devati*) village tutelary goddess ; an inscription on a pillar of the porch is the attestation. Various benefactors built and endowed particular places ; and after their time a chieftain named *Anjathicandan* acquired authority, and fixed boundary-gates at a great distance around. At that time Vellore, Arcot, and Arnee (forts) were not built ; when these were constructed that Chieftain's power had passed away.

To the paper is appended a list of ten sacred pools, and two larger reservoirs.

Observation.—The foregoing paper seems to afford some historical indications ; and the neighbourhood therein referred to would seem to abound in remains of some antiquity. Should the inscriptions not prove to be found among those in the collection, from the Conjeveram district, they would perhaps merit an attentive examination. We find herein a confirmation of section 11, and that *Jambu rayen* (or *Samb' huva rayer*) was probably the titular name of some series of rajas, or important chieftains.

Note.—From section 10 to 13, the hand writing differs, and with a few exceptions, is legible, not causing much difficulty : these sections have been satisfactorily restored, though in a very few years more the ink would have entirely faded.

(A paper not sectionized in the list at the head of the book No. 12).

Account of the Vellore Mahomedan chiefs, composed by *Velli Candaiyar.*

In the course of the *Cali-yuga, Gholam Ali Khan* ruled in Vellore. He had four sons. The names of these are mentioned, and their rule; *Acbar Mahomed Ali* was the youngest, and most distinguished. In his time one named *Sila nayaken* made great disturbance in the country. A force was sent against him, of which the marchings and halts are stated. On coming to the boundary of *Sila nayaken,* spies were sent, who after having ascended the hill-fort of *Sila náyaken,* returned and reported that they had only seen women. As many of these as should be taken were ordered to be sent to Arcot, and one named *Rangapa Chetti* advised to have their hands and feet cut off, which it is implied was done. Mention is made of a lame *Pundit,* who supplied *Sadut ulla Khan* with ten lakhs of money. The cause of the above hostile movement is stated to have originated in a disagreement between *Sila-náyaken,* and one named *Varadaiyar,* who had been accustomed mutually to accommodate each other with loans to the extent of 30,000 pieces of money. But on one occasion the loan of only 4,000 was refused to *Sila-nayaken.* In resentment *Sila-nayaken* way-laid the pregnant daughter of *Varadaiyar,* and after seizing her, had her bowels ripped open, the fœtus taken out, and its place supplied with thorns; the abdomen being afterwards sewed up. *Varadaiyar* went to Arcot, and by Mahomedan aid, effected the destruction of his cruel neighbour.

Observation.—Exclusive of the above there is some absurd matter as to the derivation of the name of the *Pálár* (or milk river), and of the *Shadaranya*; which will be found to be better given elsewhere in these papers. There is also a very loose paragraph, of no weight, as to what the writer had heard of the Mahrattas and Mahomedans, in the Peninsula. It states that the *Rayer* ruled 500 years before the Mahomedans, the *Vellalas* for 700 years before the *Rayer,* 300 years preceding are not filled up with any name, and antecedently to that period the *Sera, Chola, Pandiya,* Kings and the *Chacravertis,* ruled.

This is not a well written paper, its only use seems to be to explain who was *Sila nayaken* before referred to (section 8); and to shew how ruthless human nature can sometimes be, under particular circumstances.

Section 14.—Account of *Tirupanang-kadu* in the district of *Tiruvalúr.*

Reference to the marriage of *Siva* and *Parvati* on *Cailasa*—the assembly of *rishis*, and others, among them *Agastya* and *Pulast'hya*, at which time the earth was irregular in height, and *Agastya* received an order to go and make the earth equal, or level. A promise that *Siva* would appear to him by the way was accomplished at this place, called *Tirupanang-kodu*, as being situated in the *Dandacaranya*, abounding with *Panna* (i. e. palmyra) trees. At a subsequent period three celebrated poets named *Súntarar*, *Appar*, and *Sampantar*, came to *Tiruvalur*, and sung the praises of that place. A little to the south of *Tiruvalur*, at *Tirupanang-kadu*, the god appeared to them in the guise of an old man, struck the ground with his *súlam*, producing water, and provided food. Subsequently a *Chola* king, who had incurred the guilt of killing a *Brahman*, came this way, and to remove that guilt, seeing the place without a fane, he built a double shrine for the god and goddess, with the usual accompaniments and grants, recorded by inscriptions. After the *Chola* kings had passed away, one named *Támálavaru* built a large *mantapa* (porch) in front of the shrine, with a mud fort around. Subsequently some district chieftains turned this fortification into a strong hold, and put troops therein. In the time of *Anaverdha Khan*, nabob of Arcot, five hundred Mahrattas came by treaty, and treacherously took the fort, killing *Murtinayaken* its commander, and rasing it to the ground. The families of people for ten miles round, through fear of the Mahratta cavalry, had taken refuge in the fort: many of these the Mahrattas killed, while some escaped wounded ; the shrine was plundered, and its service ceased. In the time of *Ráyaji* the ruler of Arcot, a wealthy man from Madras made some endowments. In the great Mahomedan troubles worship ceased. The Brahmans did not succeed in obtaining the patronage of the Honorable Company. A Brahman made some repairs, with alms collected by him, and the *Cúmb'hábishégam* (or transfer of the inherent divinity of the image into a pot of water) was performed during the process of the repairs.

Section 15.—Account of the tribe of *Nohkars* in the *Tiruvalur* district.

This class of mountebanks arose about the year two hundred and fourteen, era of *Salivâhana*. They acquired skill by the assistance of *Dévi* (or *Durga*) ; on one occasion they especially exerted themselves at *Trinomali*, fixing their pole on the top of one of the loftiest turrets

of that fane, and going through their feats as though the pole was fixed on the ground. They then as a body, begged of the spectators to affiliate them into their tribes, which request was refused. At length the tribe of weavers consented to receive and incorporate them into that tribe. Hence they are considered to be the weavers' adopted children.

Note.—These people have not the appearance of *Hindus*. Perhaps they came to India about the above mentioned period; and they would desire to be naturalized. I have heard another account of their origin. They may add a class to the number of those who, being in this country, are not aboriginally *Hindus.*

III. Manuscript book No. 15, countermark 769.

Section 1.—Account of the war of *Tondaman Chacraverti* and *Visvavasu-raja.*

Adóndai, the son of *Kulottunga Chola,* having destroyed the *Curumbars,* and cleared the waste lands, ruled the country. Its four boundaries are mentioned; and a hyperbolical description is given of its splendour and power. A king from the north named *Visvavasu* came with a great army and fought with him for a year, by which much of the country was laid waste, and the whole conquered. *Adóndai* fled with some scattered remnants of his forces, and lived for some time on fruits and roots, the spontaneous productions of the earth. While wandering about, a temple of golden coloured turrets struck his view, he entered and worshipped *Isvara* and *Isvari* therein, and determined to remain there. After some time he was favoured with a vision of the local *Numina,* who assured him that his adoration was accepted, and promised him a great army, with the entire recovery of his possessions. As *Tondaman* was afraid of his adversary, this fear was reproved, and as a sign he was told, that on going to the encounter, he should find, at a certain place, the figure of *Nandi* (the bullock vehicle of *Siva*) which usually looks at the gate of a shrine turned the other way. A greatly exaggerated description is given of the battles' which resulted in favor of *Adóndai;* who at length, with his own hand, cut down *Visvavasu-raja.* This last (in the *Hindu* poetical fashion) is then represented as turning into a celestial form; and, addressing the conqueror, he gives an account of the cause why he was banished from *Indra's* presence, to be a king on earth, and to have his form restored by the hand of a votary of *Siva.* After declaring the right of

the conqueror to rule over the land, he went to the invisible world. The victorious *Adóndai* appointed ministers to assist him; and, returning to *Suriti-puri* (the place of the former vision) he made great additions of shrines and ornaments, and caused the public festivals to be conducted with regularity.

Remark.—This is only another, and more poetical, version of an account otherwise mentioned in other papers of the collection. The leading fact, that *Adóndai* conquered and regulated the *Tondamandalam* is unquestionably historical. The means will be found to exist in the collection of bringing out the connected circumstances in full detail.

Section 2.—Account of Arcot; derivation of the word; first and second settlement, and subsequent history.

The *Brahmánda-purána* is adduced as an authority. *Nandi* (the vehicle of *Siva*) for some fault, was sentenced to become a stone on earth, and accordingly became a mountain, called *Nandi-dúrga* (Nundidroog). *Vishnu* interceded with *Siva*, on behalf of *Nandi*. *Siva* ordered *Ganga* in his hair, to fall on the mountain (the river *Pálár* rises from Nundidroog), and to wash away the fault of *Nandi*. *Ganga* replied that if she descended on earth, she wished *Siva* and *Vishnu* to be in their shrines on the banks of the river, and that she might run between both to the sea. The request was conceded; and *Siva* came to *Canchi-puram* (Conjeveram) in the shape of a *Brahman*. An account of the images of *Siva*; and of the six *rishis* who established them. The waste country wherein these six ascetics dwelt was termed *Shadáranya* (in Tamil *Arucádu*) "six wildernesses," whence came the word, popularly written and pronounced, Arcot.

When *Kulottung Cahola*, and his illegitimate son *Adóndai*, had conquered the foresters of the country, they saw that this *Shadaranya* had been the abode of sacred ascetics, and hence they built many fanes, with the usual accompaniments, at *Canchi-puram*, and other places. Subsequently the edifices built by them went to ruin; and the country became a wilderness, as it had been before. Thus it remained for some time, till *Nala Bomma-nayadu*, and *Timma-nayadu*, being on a hunting excursion from *Pennacondai*, hearing there was a multitude of beasts in this forest, came hither. They saw an old hare chase a fierce tiger, and seize it by the throat, at which they were surprised; they considered this to be an auspicious place, and having caused it to be colonized, they cut down the forest termed *Arcadu*, and built there a stone-fort with treasure discovered by *Anjanam* (a kind of magic);

and, ruling there, the power descended to several generations. At length *Zulfecar Khan*, with a Mahomedan force, came into the country, and, after fighting with the *raja* of *Ginjee* for twelve years, he took the hill-fort of *Ginjee*, and placed *Davood Khan* in this country, as his subadar : *Ginjee*, and other places, were included in the district of Arcot, and the Subah of Arcot, thenceforward became famous. *Davood Khan* after regulating all things went to the north. *Zulfecar Khan* colonized the country with Mahomedans, and greatly improved it. He was superior to the former *Carnataca* raja; and he made some benefactions to *Hindu* fanes. From the constant increase of inhabitants, the town became very large. During this Mahomedan rule, it was not allowed to the *Hindus* to build large houses or to travel in any conveyance. If any such thing appeared, the persons connected therewith were seized, fined, and reduced to poverty. Such being the case with the settled residents, the persons employed as servants were six months on fatigue duty, with a bundle of rice in their hands, and another six with their hands tied together in fetters. At length when the English came into power and the disturbances had ceased, as Arcot was a large town, it received much attention, and the inhabitants were happily released from their troubles.

Remark.—The former part of this section is merely of etymological consequence; but the latter portion, as to the founding of Arcot, is valuable, and is capable of being jointed, in its proper place, with the other portions of real history to be gathered, here and there, from the materials which form this collection.

Section 3.—Account of the *Baudd'ha rajas* who ruled in the seven walled fort of *Arzipadai-tangi.*

Anciently the *Baudd'has* ruled over one-third of the country forming the *Dandacaranya.* They built a large fort with seven walls, called as above. There were *Baudd'hist* fanes of celebrity at various places; among them at *Conjeveram.* The last of their rulers was *Yemasithalan.* Many persons came to them from a great distance in the north, teaching their doctrinal and polemical *sastras.* They became very accomplished in their religious way. They were united among themselves, and sent their children to a great distance to receive instruction.

Two persons named *Acalangan* and *Nishcalangan* produced a persecution, by privately writing in a *Baudd'ha* book that the *Jaina* system was the best one. A device was had recourse to in order to discover the authors; and, on being discovered, they were forced to flee for

their lives, hotly pursued; when *Nishcalangan*, by sacrificing his life, contrived to allow *Acalangan* to escape; charging him, on succeeding, to spread their system. The *Baudd'has*, in the heat of the moment had tied a piece of flesh in all the *Jaina* fanes, with a *sloca* of contemptuous import. *Acalangan* after his escape put a vessel, containing ordure, in the *Baudd'ha* fanes with another *sloca* in retaliation. Under these circumstances of discord, the *raja* ordered an assembly of *Baudd'ha* and *Jaina* learned men to dispute with each other, and to finish within a specified time, when he would himself embrace the victorious system, and put all of the opposite party to death by grinding them in oil-mills. The *Baudd'has* concealed themselves behind a thin cloth enclosure, so as to see their opponents without themselves being seen; and, managed the discussion by means of doing homage to an evil goddess, as the appointed term approached, the *Jainas* became anxious for their lives. In this extremity *Acalangan* had recourse to a goddess named *Svála-dévi*, who appeared to him, and gave him a phrase to use, which would mean, "what more"? or "what is there behind"? bidding him kick with his foot behind the veil or curtain. On the morrow *Acalangan* enquired "What more"? or "what is there behind"? and at the same time by kicking at the curtain, he broke a large jar in which the fermented juice of the palm-tree had been kept, wherein from long standing there were worms, and whence an offensive smell proceeded. The king in consequence declared the *Baudd'has* to be conquered, to which they were compelled to accede. *Acalangan* was afterwards admitted to the *Raja's* presence; and became his instructor.

There is a reference to further matter on the subject contained in book No. 27.

Remark.—Under restriction as to that reference, it may be observed, that from this section the *Baudd'has* and *Jainas* clearly appear to have lived together as people of one religion, under two modifications; the *Jainas* gradually increasing by coming from the north; and that only a casual dispute led to the violence of a schism. The account is an *ex-parte* one from the *Jainas*, who seem to have supplanted the *Baudd'has.* The statement that these last had a fane at *Conjeveram* is consistent with vestiges found there, and elucidates a part of the Madura *Sthalla purāna*, while it affords an idea as to the time, checking the extravagance of that *Purana.* Supposing the statement received from the *Jainas* to be with them a matter of record, or correct tradition, we may conclude with certainty that incidents in the Madura *Purána*, carried up to a high antiquity, were not more remote than the

early part of the Christian era. In this way, I conceive, documents which seem to be trifling in themselves may, by comparison with other documents assist in elucidating points of actual history. The *Brahmans*, and the *Baudd'has* or *Jainas*, are the best possible checks on each other. The punishment by grinding to death in oil-mills, is one well known to Indian history; and in the progress of development of these papers it will be seen that *Baudd'has* and *Jainas* were subjected to it, at a later period, by *Hindu* kings under *Brahmanical* influence.

Section 4.—Account of the destruction of eight thousand *Jainas* by the famous *Sampantar Murti*, at *Punai-takai-matam*.

This is an account considerably ornamented, and much resembling the accounts which we otherwise have of the destruction of the *Samanar* at Madura, herein also referred to. The site of the transaction is however different; the name of the king who is concerned is not mentioned, nor yet the name of his kingdom. I am doubtful whether the transaction be not the same with that which occurred at Madura. At all events the paper is worth translating as a note or illustration to any leading view of the whole subject. The general fact that *Sampantar* was the inciter of an extensive and cruel persecution of the *Baudd'has* (or *Jainas*) by the *Saivas*, is historical.

Section 5.—Account of the first founder of the *Chóla* kingdom named *Tayaman-nalli*.

Anciently the *Pandiya*, *Chóla*, and *Tonda* countries were one vast forest, called after *Dandaca*, a *rácshasa* that dwelt in it. *Rama* brought several people from the north, and one person, named *Táyaman-nalli*, settled at Trichinopoly; then surrounded by a vast wilderness. He built a fane and placed an emblem of *Siva*, called after his own name, on the rock: he also paid great attention to cultivation. He had a son called *Ven-Cholan*, from connecting the Cauvery river with the *Vennar*, and thereby fertilizing an enlarged extent of country. His son was *Cari-Canda Chola* so called from having embanked the Cauvery river.

Remark.—Of the accuracy of this paper I have some doubts, chiefly because the name of the fane on the top of the rock of Trichinopoly is said to be an epithet of *Siva* of the same import, in Tamil, with *Matri-Vhuvésvara* in *Sanscrit*, that is "*Siva* who became a mother," from a fable that *Siva* gave suck to an orphan; being no doubt some historical circumstance, veiled under an emblem or hieroglyphic. The name was also borne by a famous *adwita* poet at Trichinopoly: whether it belonged to a colonist from the north, as stated in this paper, I would leave others to determine.

General note to manuscript book No. 15.

The paper on which this book is written remains in good preservation, unattacked by insects. But the writing being very pale, and liable to early illegibility, pointed it out for restoration. The contents of the book are of average interest; and a few passages are rather special.

IV *Carnataca rájákal Savistara charitra* or a general history of the peninsula.

Palm leaf manuscript No. 214—Countermark 75.

This work, which is of no ordinary interest or importance, professes o be a general history of Peninsular India, Mahomedan as well as Hindu, and to include the period from the commencement of the *Cali-yuga* corresponding with the installation of *Paricshita* son of *Abimanya*, and grandson of *Arjuna*, down to *Cali-yuga* 4908, being *Acheya* year of the *Hindu cycle*; era of *Vicramadaitya* 1864—*Salivahana saca* 1729 (A. D. 1807-8). It is a great pity that there is a small chasm in one place, and a much larger one in another; though not in the most valuable portions.

The general nature of the work may best appear from the following abstract, often little more than a mere index to the contents.

Introduction.—The usual invocation. The author's name, *Narraynen* of the *Anantakon* race of *Ginjee*. The book was composed while Lord W. Bentinck was governor of Madras, at the special request of Colonel William Macleod then commissioner at Arcot, who desired *Narrayanen* to write down a narrative of events in India from the earliest times, as such an account would be very acceptable to Europeans. In consequence of this request *Narrayanen* felt great anxiety that his work should be complete and authentic, and after six months preparatory study, during which he specially procured the aid of learned Mahomedans, and acquired from them all the details of their books, and records, he wrote down this compendium of results. He offers the customary apology to authors and critics for any deficiency that may be found in his production.

The Narrative.

The first *Cánda*, or section, on primeval matters. A reference to the creation of elementary principles—the *Brahmandam*, or mundane egg; the formation therein of the different orders of beings and things. The greater and lesser periods, or ages—periodical deluge—formation

of inferior gods, *asuras,* and men—Avataras of *Vishnu*—Eclipses—how accounted for—Fasting at that time peculiar to India—*Hindu* notions of geography—mention of *Nipal, Moghulistan, Turkistan,* and *Hindustan* proper—The birth of *Crishna,* about one hundred years before the end of the *Dwapara-yuga;* and his building the town of *Dwaraca,* on the sea coast, and reigning there. His actions are stated in plain language, divested of the marvellous.

The second *Canda,* or section, relating to the royal line of *Hastinapuri.*—The genealogy of the race deduced from *Soma.* Accounts of the *Pandavas,* and other persons, similar to matters in the *Mahabharata,* but reduced to simple narrative, by the rejection of hyperbolical metaphors. A long lapse of time given to the later descendants, subsequent to *Janamejaya. Vicramaditya* conquered and ended that race. References to *Salivahana* and *Bhoja raja* with their successors (of great value if authentic) down to year of the *Cali-yuga* 3,700, about which time is fixed the commencement of the *Hegira. Hindu* kings ruled 591 years after that period. The conquest of *Delhi* placed in the reign of *Prit'hu.* Rise of the Mahomedan ascendancy.

The third *Canda* or section.—Account of the *Willaet,* or original country of the Mahomedans.—Geographical details and definitions of the country north-west of the *Indus,* adapted to aid in fixing the reference of names in *Pauranic* geography. Mention of Alexander's victory over *Darius.* Extended notice of ancient *Iran* and *Turan.* Rise of Mahomed, in the year of *Vicramaditya* 621, era of *Salivahana* 486. Notices of the Caliphs his successors. A somewhat full account of *Hassan* and *Hussan.* Various subordinate matters. Persian invasion of *Moultan* and *Lahore* (by way of *Candahar* and *Cabul,*) against *Rama Deva* king of that part of the country (*Hegira* 431), who routed the invaders and drove them back across the *Indus* at *Attock.* Reference to *Firdousi* author of the *Shah Nameh;* the insufficient reward given to him, which he bestowed in charity—and satirised the promise-breaking patron. Invasion of *Delhi* from *Persia*—taking tribute. Extension of the irruption in the *Deccan*—plunder of the *Carnataca* country, extending as far as Seringapatam. Images of gods taken thence, and carried to the *Padshah* at *Delhi. Ramanuja* was then at Seringapatam—and went to the *Padshah* at *Delhi;* by making interest through the medium of the *Padshah's* daughter he recovered the sacred images, and brought them back. The *Padshah* after making a treaty with the Delhi monarch re-

turned to *Iran*. Another invasion in the year of the Hegira 622—with subordinate matter.

Section 4th—On Delhi affairs.

In *Hegira* 625 *Sultan Caias-din Padshah* invaded *Moultan* and was defeated. There are many following details of battles and negociations, not well admitting of an abstract. At a later period there is special mention of *Mira Ali Udin Gory*, as having conquered *Baharam Shah*, and being seated on the throne of Delhi. He sent to demand tribute from the southern kings in India, which was not given, and the refusal led to various hostilities. Affairs of *Guzerat* are introduced. *Firoz Shah* is said to have acquired extensive power in Hindustan. Other details of more or less importance are given.

Section 5th—Account of *Timur*.

A shepherd boy, named *Tayamur*, was in the habit of leading out a few sheep, belonging to his mother, to the forest—wherein one day he met a holy man, who, in a manner minutely detailed, prophetically announced his future sovereignty, and that he would be the head of a dynasty of twenty-one kings. At 18 years of age *Tayamur* discovered treasure in a well—relinquishing the care of sheep, he assembled troops and made successful incursions on *Irân*—he overcame various chieftains, and conquered the troops sent against him by the *Padshah*: defeated the *Padshah* himself, and took him prisoner. In *Hegira* 773, *Tayamur* imposed tribute on *Iràn*. He subsequently attacked the kingdom of *Turan*. *Tayamur* gave to four of his sons four kingdoms. He invaded *Afghanistan*, and overthrew its ruler. Subsequently *Tayamur* invaded *Hindustan*. He sat down on the Delhi throne, *Hegira* 801.—" Minor details.—Transactions with the *Shah* of *Roum*.—Intending to invade the empire of China, he fell sick, and died on the way, H. 807. Various details of the Delhi empire follow. At a later period some notices of *Oudipore* and *Jeypore* are given.

(A small chasm occurs, the palm leaf No. 51 being wanting—it may be recovered, and space is left for it in the restored copy).

Some details respecting *Humaion Shah*: his recovery of courage after the loss of his kingdom ascribed to a singular reproof unconsciously given to him by a woman, who charitably bestowed a meal on him when he was a fugitive in disguise.

Acbar—His enquiries into *Hindu* literature, part of it transfused into Persian, at an expense to him of three crores of rupees. He died H. 1014. His son *Jehanguir*—intemperance—other habits—attachment and gifts to *Nourmahal.* Notice of the Bengal *Soubah* held by the younger brother of *Nourmahal,* who abusing his trust, was ordered to be beheaded, but escaped by her contrivance. Anecdote of three lime kilns, kept ready by the *Shah* for the death of himself, of *Nourmahal,* and her brother, in case of emergency. *Aurungzebe*—The *Mahrattas*—Various details. Foundation of *Aurungabad,* H. 1060. Notices of *Adil Shah,* and the ruler at Hyderabad. Magnificent tomb. Details of tributaries. *Aurungzebe's* behaviour towards his father and brothers. Affairs of the *Punjab* and of *Guzerat.* Mention introduced of *Anagundi, Ginjee,* and other *Carnataca* countries; Vellore, Ginjee, Arnee. Tanjore governed by him. War with *Sahoji,* chief of the *Mahrattas.* Death of *Siloji raja.* Crowning of *Sahoji* who ruled in *Sattara.* The *Padshah* sent *Zulfecar Khan* to conquer the *Carnatic*; fought with the *Mahrattas,* took *Ginjee.* Mention of *Daood Shah,* made *Killadar* of *Ginjee.* *Zulfecar Khan* returned. The *Mahrattas* attacked him. Details of the *Mahrattas.* *Aurungzebe* sent his son *Asuph Shah* to Bengal. Arrangement for his sons previous to his death, which took place in H. 1119. Various details concerning his successor. Details relative to some *Amirs* of the palace. Other matters down to H. 1131, when *Mahomed Shah* became *Padshah.* He sent out a *Firman* to various kings as far as to Arcot. Various details inclusive of Carnatic affairs down to *Nadir Shah*—*Ahmed Shah*—Subsequent matters.

Section 6th.—Concerning the *Mahrattas,* and the *Tuluva* country.

The country referred to in this section lies between the Nerbudda and Toomboodra rivers (the *Nirmathi* and *Tumbudra*). That land used to give tribute during the *Dwapara-yuga* to the kings of *Hastinapuri* down to the time of *Janamejeya*—*Salivahana* was born, an illegitimate child of a *Brahman,* at *Munguilpatnam,* at or near to *Ramagiri* (or Dowlutabad). He made extensive conquests even to the Cauvery river. He overcame Vicramaditya, and placed the son of the latter on his throne as a tributary, at Ougein. Many other kings ruled for 4,000 years. Transition to the land of *Tuluva,* and the upper *Carnataca desam.* A shepherd of the Curumba tribe did service to a *rishi,* or *ascetic,* who discovered to him hidden treasure, with which the shepherd, quitting that occupation, raised troops, and laid the foundation of *Anacondai,* and afterwards of *Vijayanagaram.* He was named *Pravada-*

deva-rayer. No mention of intervening matters down to *Narasinga-deva-rayer*, who introduced a new dynasty.

Section 7th.—On the *Hassan* dynasty of the *Deccan* kingdom.

This kingdom began with Hassan, a contemporary with Rama-deva, of the foregoing race. He was of humble origin. A *Brahman* saw him sleeping in the sun, his face shaded by the hood of a *cobra-capella*, and thence prognosticated his future greatness. At a time when a sovereign was wanted, and an elephant, with a wreath of flowers on its trunk, was deputed to fix on the proper person, the animal selected Hassan from a multitude of people, and deposited the wreath on his head. He was in consequence chosen king.

(In this place some palm leaves of the copy are wanting, how many cannot be determined, as the No. of the page is uniformly reckoned, from the beginning of the section; spare sheets will be left, in the binding up of the restored copy, sufficient to allow of the filling in, should the deficient matter be hereafter recovered. There is so close a coincidence between the beginning of the section, and the account given by *Ferishta* of the commencement of the kingdom of the *Deccan*, that possibly the whole section may only have been an abridgment of *Ferishta*, received by the author *Narrayanen* from Mahomedans at Arcot. If so, the loss is immaterial, but if otherwise, it is much to be regretted, as a check on the mendacious *Ferishta* is very desirable).

Section 8th.—Concerning the lower Carnataca country.

Definitive boundaries of the Carnatic. The *Toudamandalam*—capital *Conjeveram.* The *Canara* country—capital *Seringapatam.* The *Cholamandalam*—capital here said to be *Chenji* (Ginjee). *Chola-desam* on the Cauvery, its capital *Tanjore.* To the south *Pandiya-mandalam*, capital *Madura*, with *Trichinopoly.* *Chera-mandalam*, capital *Tiru-nagari.* *Keralu-desam*, capital *Ananta-sayanam.* *Telinga-desam*, capital *Kola-condai* (Golconda). Revenues of those different kingdoms, the *Kerala-pandiya*, *Chola*, and other rajas were tributaries to the royal house of *Hastinapuri.* Some notice of the incarnations of the emblems of *Vishnu*, the (*Chank*, *Chacra*, &c.) in the persons of *Marer*, *Sadugo-parva* and others. Notice of *Manica*, *Vasacar*, and *Sampanatr*, their polemical contests with the *Samunar* (*Baudd'has* or *Jainas*). Subsequent to that time the *Vaishnava* sect experienced a

depreciation, owing to the ascendancy gained by the *Saivas*. Notice of Tamil poets—*Camban, Pugerentan, Otta-cuttan*. *Camban* composed his poetical version of the *Ramayanam* in Sal. Sac. 807. Notice of some *Chola* kings. The *Vaishnava* teacher *Ramanuja* flourished Sal. Sac. 939. *Trib'huvana Chacraverti*, became *Suntara Pandiya-dever, Fusly* 460. *Vira Pandiya Cholan* was his son. *Ramanuja* lived in his time. (These points and dates, considered as the author's testimony, are very important, as a check on accounts by the *Saivas*). Notice of the first inroad made by the Mahomedans into the *Carnatic*. Many details concerning *Crimi-canda-cholan* ; of *Ramanuja* ; and—the Mahomedans. *Cari-cara-cholan* flourished 570, Fusly. *Villiputturar*, a poet in the *Conga-desam*, translated the Mahabharata into Tamil verse, at the promised reward of five gold huns each stanza (of four lines) ; on his task being finished, the king gave him only five fanams each stanza. Story of *Nandi*, a king of the *Chola* country, his hunt of a pig, which in the end became metamorphosed into a figure of *Vishnu* in the *Vahara-avatara*, a shrine was built on the spot. Origin of *Chenji* (or Ginjee). A treasure was discovered by one *Anantakon*, a shepherd, who raised troops therewith ; and getting aid from other chiefs, established himself as a raja, Ginjee being his capital—this was *Fusly* year 600. He cut a canal for irrigation near *Trinomali*, which in the course of time having become filled up, was restored by the *Nabob* Wallajah, Fusly 1184. *Anantakon* gave to his tribe the name of *Sammanamanar*. He was succeeded by *Crishnakón*, F. 650. *Goneri-kón* : F. 680, both of them built sacred edifices. His son was *Govinda-kón*, F. 700. *Palliya-kon*, F. 720, he made roads, choultries, &c. The dynasty now gave way before a *Curumba* tribe named *Vadaga Yediar* (north country shepherds) ; the first king of this tribe was *Kobi-lingan*, F. 740. He built a brick fort at *Chentamangalam*. He formed some tanks, and left others unfinished. In his time, his feudatories built several forts with bricks in different places, as *Asupur, Pelacupur, Cupam-colur*, &c. He formed channels to bring down streams for irrigation from mountain-springs ; among which the one named *Kobilingan-juni* remains to this day. He ruled with great equity. Afterwards, F. 800, *Narasinga Udiyar* became viceroy. The *Maha-rayer* of *Anacondai, Vijayanagaram*, and *Pennacondai* sent an army against the aforesaid *Kobilingan*, and having conquered the country he delivered it over to *Narasinga Udiyar*, to be held as a fief sending tribute to the rayer. A donation was made to a fane, or temple, Sal. Sac. 1332 (A. D. 1410). About this time the *raja* of *Vandi-*

vasi named *Bupati-rayer Udiyar* ruled according to an inscription dated in Sal. Sac. 1341. *Vira-vijaya-rayer* was also a ruler over that district. *Vallula-rayen* ruled F. 750. He made additions to the shrine at *Trinomali,* he paid tribute to the *rayer.* After he fell, the country being divided among petty chiefs, became subject to *Crishna-deva-rayer.* He sent a great army into the Carnatic, said to have consisted of 100,000 men, under the command of chiefs named *Vaiyapa-nayaker, Tubaki Crishnapa-nayaker, Vijaya Raghava-nayaker,* and *Vencatapa-nayaker.* In *Fusly* 870, *Vaiyapa-nayaker* came and collected tribute extensively. He encamped near Vellore. The chief at Chittoor, and other petty chiefs of the *Tondamandalam,* had an interview with him. He fixed their rate of tribute, mention is made among others of *Bommareddi* of *Calastri.* The rayer's general afterwards went to Ginjee. The chiefs of the *Chola-mandalam* had an interview with him, and their tribute was also settled. *Vaiyapa-nayaker* continued at Ginjee with his army. He gave it in charge to the subordinate generals to go and levy tribute on the *Pandya, Chola,* and *Chera* kingdoms. In *Tanjore, Trichinopoly, Madura,* and *Tiru-nagari,* the kings respectfully answered to the demand. Thus the eastern Carnataca (as distinguished from Mysore, &c.) became subject to the *rayer.* He derived three crores of rupees from this country, and in consequence he divided the whole into three parts, under three viceroys. *Crishnapa-nayaker* at Ginjee, governed the country from Nellore to the river Coleroon, *Vijaya Raghava* at Tanjore, governed the fertile country, washed by the Cauvery river, and to *Vencatapa-nayaker,* was assigned the country south of the latter. Notices follow of the proceedings of these viceroys. A Mahomedan coalition was formed against the *rayer.* The principal viceroy of the latter was recalled, with his troops; and *Tubaki-nayaker* thenceforward assumed independency at Ginjee. His successors with their dates, and proceedings are mentioned. The last of them *Appa-nayaker* is described as weak and vicious to an extreme. He came to the throne, *Fusly* 1030, and in his time a Mahomedan confederacy, the formation of which is ascribed to the treachery of *Bomma-raja* of Chingleput, brought a deluge of Mahomedan troops into the lower Carnatic. The siege of Ginjee, and its capture, after great resistance are described with considerable force and spirit, and at much length, as the author is writing about his native place. The proceedings of *Vijaya Raghava* at *Tanjore* are also alluded to : he purchased peace. *Tirumala-nayaker* of *Madura,* by the assistance of the Collaries routed and repelled the Mahome-

dans, who returned discomfited to Ginjee. Irruption of the *Mahrattas* into the country, seizure of *Tanjore*, tribute imposed by them on other places. Proceedings of *Sivaji* in the lower *Carnatic*. Arrival of the English at *Chennapatnam* (Madras). Notice of other Europeans. From this time forwards, there is a minute, and generally correct, detail of the proceedings of the English and French in connexion with the Nabob on the one part, and *Chunda saheb*, &c. on the other part. The French capture of *Ginjee* is circumstantially stated. The whole of the connected and subsequent transactions are interwoven with details as to motives on the part of native princes, such as perhaps our English historians, who have gone over the same ground, may not have so fully known. *Hyder Ali* and *Tippoo's* proceedings are fully described, and the commanding interest of the narrative may be considered to close with the final capture of Seringapatam, and its celebration at Madras. The author however continues his narrative onwards a few years later ; and closes with a reference to the regulation of the Arcot country, and its management by his patron Colonel W. Macleod, as Commissioner.

Remark.—In a general retrospect of the contents of this large manuscript, it appears that the suggestion of an English gentleman, produced that rare result a native Hindu historian, writing under the influence of good sense, and in conformity, to a prevailing degree, with European notions of history. In an abstract, I have not felt myself obliged to verify or compare his dates and facts with other authorities. There are probably some anachronisms and errors, but the value of the whole seems to me considerable, and the eighth section, down to the arrival of the English, invaluable. To me that matter is new, and with the incidental co-incidences derivable from other papers in this collection a narrative may now be carried upwards, with some degree of certainty, to the era of *Crishna Rayer*, about which time there is only a short interval of an archy till we reach the regular *Chola* government. The whole manuscript, but especially the first half of the eighth section, ought, I am of opinion, to be carefully translated and edited.

Professor Wilson's notice of this MS. (Des. Cat. vol. I. p. 199) is as follows—" xi, *Kernata rajakal, a* palm-leaf, *b* do. *c* do. *d* do. An account of the sovereigns of the *Carnatic*. After a short notice of *Yudhishtira*, and his brethren and of some *Hindu* princes of the lunar family, the MS. gives an account of the Mogul sovereigns of *Hindustan*, and the family of *Nizam Ali*—MS. *b* is an abridgment."

On reading this notice, I went to the Literary Society's Rooms, and

searched for a second copy, without succeeding in finding one. This copy is much injured by insects. I shall be gratified if eventually I may succeed in effecting one completely restored copy.

B.—TELUGU.

1. *Crishna-rayer Vijayam,* or the triumph of *Crishna-rayer.*

Palm-leaves, No. 42.—Countermark 308.

This book is in Telugu verse, of an ornamental kind. Its object is chiefly to celebrate a victory obtained over the Mahomedans and a treaty cemented by marriage with the *Gajapati,* or king of *Orissa.* After the victory over the Mahomedans, it was judged expedient also to curb the *Gajapati,* who was in alliance with them. At first war was commenced; but difficulties arising, by the counsel and skill of *Appaji,* the *Rayer's* minister of state, proposals of peace from the *Gajapati* were brought about, and the latter offered to give his daughter in marriage to the *Rayer.* In the native manner, a parrot, it is said was sent to narrate to the *Rayer* the descent and superior qualities of the other *raja's* daughter. This office the parrot discharged and the marriage was celebrated, with which the poem concludes.

This copy of the work is written on palm leaves decayed at the edges, but otherwise complete, and in good preservation. Its restoration does not seem to be urgent, or indeed important; the following is a fuller abstract of the contents.

The authors' name is *Vengaiyan,* son of *Calai,* who invokes his gods, and the poets of antiquity, such as *Valmica* and others. He wrote by direction of *Sri Rama* given in a dream. *Hari-hadi-chenna Vencata Bupala* was his patron, who instructed him to write the history of *Crishna-rayer.* He first celebrates *Vijayanagaram* and the praises of *Narasinga-rayer* (father of *Crishna-rayer*)—he states that *Narasinga-rayer* demanded of him an account of the primitive state of the *Vidyaranya* (site of *Vijayanagaram*) and of the worship of *Virupacshi* (a form of *Siva*) and of the proceedings of *Vidyaranalu* (a sage) before the town was built. These are narrated to the following purport.

Isvaren assumed the form of *Vidyaranalu,* afterwards called *Sancarachavya*; he demanded and received from *Lacshmi* the privilege of having a town built in that wilderness bearing his name, where she

(*Lacshmi*, that is plenty) might always reside. She directed him to go and choose some place. He went to the banks of the *Tumbudra* river, and there seeing the fane of *Viru-pacshi isvarer*, he enquired into the origin of the place; which those versed in such matters narrated to him. The legend was founded on a tale from the *Ramayanam*. *Sugriva* ascended this hill, but *Vali* could not do so. There are five hills called *Malvatam, Yema-cutam, Busuva stringam, Madhanga-parratam, Kishkindi*. They told him that this sacred land was suitable for his abode. At the same time he perceived a hare chasing a lion at which being surprised, he remarked that this was a special place for the brave, and here a town must be built to be called (after his name, *Vidyanagaram*.

A transition is then made by stating that *Narasinga Rayer*, after hearing many things on the ancient history of the place, addressed his minister *Appaji*, stating his wish, that his son *Crishna-rayer* should be crowned, or installed, which was accordingly done. *Crishna-rayer* sought advice and kingly prudence from *Appaji*, who instructed him. He then desired to see all the forts and other strong places, he acquired full information on all points; he also went out in disguise, the better to know if the matters conveyed to his knowledge were true. He thus lived some little time in a *Brahman's* house unknown; but being found out by his *harcarras*, the *Brahman* asked why he so came? He said it was for "the destruction of the evil, and protection of the good." The minister *Saluva Timma* brought to him great treasure. The *harcarras*, in his hall of audience, reported to him matters concerning *Visiapuram*, and the *Nizam*; that a negociation was being carried on between the Nizam, the *Gajapati* prince, and the ruler of *Visiapuram*, in consequence of a dread or dislike of *Crishna-rayer's* accession to the throne of *Narasinga-rayer*. The minister represented that, as the *Gajapati* was a worshipper of *Jaganatha*, and a protector of the *Brahmans*, it would be right to pardon him, and it was determined on to proceed against *Delhi* (the Mahomedans) in reference. To this end preparations were made; and *Crishna-rayer* proceeded at the head of his army. Many favorable omens occurred; inferior chiefs of districts were overcome and their districts assumed. All who submitted were protected; at length, after many conquests, he directed his march against *Golconda*. A great army, amounting to a hundred thousand cavalry, came thence with precipitancy, and halted on the other bank of the *Kistna* river. A general, assuring the *Rayer* of his ability to disperse the *Mahomedans*, received per-

mission to do so, and he fell upon them on the bank of the river; when, after hard fighting, the *Mahomedans* were defeated and fled.

Some persons advised the *Rayer* to assault the town; but the advice of the minister was, that the place was too strong: he rather advised to direct their course eastward against the *Gajapati*, who had harassed and impeded them on their march. The *Rayer* consented, and while on the way to attack the *Gajapati*, he was opposed by scattered portions of different people, fighting without union or plan, who were one by one overcome, and at length they all came proffering submission. The *Rayer* received them favorably and confirmed them in their possessions (as tributaries understood). Proceeding onwards the *Rayer* with his army invested *Amidanagara* (*Ahmednagur*). The *Mahomedans* of the place made fierce resistance; but were at length defeated. *Crishna Rayer* took possession of that hill-fort, and erected his flag on it. Still advancing against the *Gajapati*, his minister *Saluva Timma* represented to him, that though he could unquestionably conquer the *Gajapati*, yet that the road was difficult, opposition would be considerable, and that it would be best to make a treaty of peace with the *Orissa* prince.

Crishna Rayer paid no attention to him, but saying that the forest was no great thing, it could be cut down, and the *Gajapati* no great matter, he proceeded in anger. On the way *Sidavu Khan* opposed with sixty thousand bowmen. The fighting was obstinate; the *Khan* having for his object to promote the glory of the *Gajapati*. News came to the *Orissa* prince, that *Crishna Rayer* was approaching, and the ministers of that prince advised him to go to the reinforcement of the Mahomedan chief; sixteen other chiefs around the *Gajapati* rose up and asked leave to go against the invading army, which leave was granted. *Crishna Rayer*, hearing of their coming, became discouraged, and reflecting on his having before slighted the advice of *Appaji*, he sent for him, admitted the error, and asked him how it was now suitable to act; *Appaji* said it would not be possible to conquer their opponents, but that division must be caused amongst them. Receiving all needful treasure from the *Rayer*, he wrote deceptive letters, addressed to the sixteen *chiefs*, and sent them in boxes in which were presents of money, with honorary dresses and ornaments; these were given to messengers who were sent on alone,and falling into the hands of the *Gajapati's* people, they were taken before him. The *Orissa* prince read the letter with great astonishment. The purport was to say that *Crishna Rayer* consented to the terms proposed by the chiefs, and that if they would take and deliver up the person of the *Gajapati raja*, the villages, money, and jewels, as stipulated, should be made over to them. The *Orissa*

prince, fearing for his personal safety, retreated to some distance privately; and the chiefs, not seeing the king or knowing what was become of him, desisted from fighting. The *Rayer*, on his part, did not advance his troops, and made no assault. *Appaji* now proceeded to the *Orissa* prince, and told him that *Crishna Rayer* desired his welfare. The *Gajapati* hesitated for a time; but at length, thinking the *Rayer* might be trusted, he came to an audience, bringing presents. Both parties exchanged salutations; the *Gajapati* offered his daughter in marriage; and *Appaji*, being greatly rejoiced, strongly recommended the union. At the desire of the ruler of *Orissa*, *Appaji* followed him, being treated with great honors, and allowed to see the king's daughter. When about to return, the daughter named *Tucáramani*, sent a parrot to her father, who transmitted it by *Appaji* to the *Rayer*. The bird after narrating its own divine origin, and the perfections of the person sending it, gave the *Rayer* satisfaction. The marriage was celebrated, and the *Rayer* returned to *Vijayanagaram.*

Note.—This somewhat full abstract may perhaps supersede the necessity of any translation, so far as historical objects are concerned. *Ferishta* admits that *Crishna Rayer* severely defeated the Mahomedans: the other matters are probably historical. The ornament at the close may be oriental metaphor merely, to designate a messenger who was to repeat what was ordered, and no more. *Saluva Timma* seems to have been the proper name of the minister; and *Appaji* a sort of title of office. Many tales are current of the skill and address of *Appaji* the minister to *Crishna Rayer.*

Prof. Wilson's notice of this manuscript may be found in Des. Cat. vol. 1. p. 296.

Manuscript book No. 33.—Countermark 787.

Section 5.—Brief narrative concerning the rule of the *Setupatis*, as feudatory princes at *Ramnad.*

This paper mentions a traditionary guardianship of the *Ramiseram* temple, committed to seven persons, one among whom by hereditary descent, was *Saiduca*, who in Sal. Sac. 1527 (A. D. 1606), was made lord paramount of the *Marawa* principality, by *Tirumala Nayaker*, ruler of *Madura.* The transmission of the authority downwards, with dates and names and mention of connected events, is continued to Sal. Sac. 1716 (A. D. 1795).

As this short paper was translated and printed at the end of the appendix to vol. 2, of Oriental Historical MSS. any more lengthened notice, than the above is not required. The original text was not then given, and as the writing of the document was rapidly fading, it appeared suitable to have it restored, and available at any time for reference, as a record.

Manuscript book No. 31.—Countermark 785.

Section 1.—Account of *Tirumala Nayadu,* and of his descendants the *Carnátaca* rulers of Madura.

This manuscript was also translated and printed in the second vol. Or. Hist. MSS., beginning at page 182. Hence there is need only to observe in brief, that it commences with the accession of the son of *Tirumala Nayaker* to the throne at Madura, and brings the account downwards, with a somewhat minute specification of wars, negociations and changes of power, to the period of the last feeble remains of the race, who received a village for their maintenance. In some of the details, where most obscure, this manuscript is confirmed and elucidated by the large Tamil manuscript before mentioned, the *Carnataca-rajakal.* At the time of making the above translation, this Telugu MS. was not without difficulty legible ; a rough copy of it was then made for greater convenience, and as the lapse of two years since has only added to the difficulty of reading the original, a restored copy has been prepared from the original, aided by occasional reference to the rough copy ; and, the text not having been printed, a correct record for reference is thus provided.

Section 2.—An account of the rule of *Cari Cála Cholan.*

In consequence of war with the *Pandiya* king, a woman of the *Chola* royal race, named *Cungama Gent'hi,* escaped alone into the wilderness, being pregnant ; and took up her abode in the house of a *Brahman,* a schoolmaster, and also an astrologer. By his art he declared concerning the child, after casting its nativity, that it would become a powerful and independent prince. In the ceremony of naming the child it was called *Cali-cholan.* After the ceremony of investing with the sacred thread, and while learning in the school, the boy was the object of much contempt from the other boys, being treated as the son of a widow. He retaliated on them ; but the *Brahman* thought it best to keep him

within the house. He became well instructed in knowledge and very powerful in bodily strength. The *Pandiya* king then ruled the *Chola-mandalam ;* but, wishing to place over it a viceroy, he made public proclamation in order to meet with a suitable person. A great concourse of claimants assembled. The *Pandiyan* then put a golden pot containing water on the head of an elephant, and a wreath of flowers in its trunk, announcing that the person on whom the elephant should place the wreath and anoint by pouring on him the water, would be regarded as chosen, and to that person the king would give his own daughter in marriage. The elephant being let loose, avoided all the people in the town, and going direct to the aforesaid *Brahman's* house, there selected the youth by depositing the wreath on his head, and pouring the water over him. The young man was as strong as ten elephants, but in order to diminish his strength, the *Brahman*, rubbed the sole of one of his feet with charcoal, and thereby took away the strength of nine elephants, leaving him only as strong as one elephant. He was subsequently installed at *Combaconum*, and had the name of *Cari Cala Cholan* given him, to commemorate the rubbing of charcoal (*Cari*) on his foot. But the king's daughter was not given him. He strengthened and enlarged his capital town. The young man, learning, from his mother, that his father was before him king of the *Chola* country, that his father had feared to encounter the *Pandya* king, and had died during the disturbance that had arisen, resolved on vindicating his own, and his father's right; and, assembling an army, set out to make war on the *Pandiya* king. The army is stated at 250,000 cavalry, under commanders whose names are given, who approached the *Vaigai* river. The *Pandiyan* alarmed, brought to him treasure and jewels, and, after much flattering homage, embraced him, and conducting him to his palace, seated him, on terms of equality, on half of his throne, and married him to his daughter *Sid'hesvari*, after which *Cari Cála Cholan* returned to *Combaconum*, where there were great rejoicings. He allowed the cultivators three parts of the produce, and took one fourth (the ordinary rate used to be one sixth) with which revenue, he built and repaired many sacred edifices, gave large donations to *Brahmans*, heard many religious stories recited, and was a firm votary of *Siva*. In order to see if his people were firm in that way, and with a view to discover and rectify evils, he was accustomed to go out in disguise, covered with a common dark coloured hair blanket, during the night. Out of this custom, arose the following circumstances.

There was an aged *Brahman* who, as the result of long penance, had a son born to him, who, when grown up was married, and the old man died; but not before having charged his son to carry his bones to *Cási*, and bury them in the *Ganges*. The young man prepared to do so; but on the eve of setting out slept in the porch of his house, and there gave strict charge to his wife to keep within doors, while he should be absent for a year and a half; the only exception being, that if in want, she might ask alms of the charitable prince *Cari Cála Cholan*. The latter was at the door; and admiring so great an act of confidence, determined on being the watchful guardian of that house. While the *Brahman* was absent he watched it carefully; but the *Brahman* returned within six months; on the way to complete his pilgrimage at *Ramiseram*, and wishing to assure himself of his wife's discretion, approached the door alone at night, and looked in through its apertures. The *Cholan* came thither at the same time, and, thinking the *Brahman* was a thief, cut him down with a sword, and retired. His wife next day suffered great reproach from her neighbours, but recognizing her husband, she burned herself with his body; and the king having unconsciously killed a *Brahman*, had the visitation termed *Brahma-hatti* (a personification of the crime, as if an evil spirit, always following him). He made many attempts to get rid of it; but though the spirit quitted him at the door of a temple, or entry on a sacred pool, yet it always returned afterwards. He went on pilgrimage to the shrine of *Minatchi* at *Madura*, who, in a vision, informed him that the visitation could not be so easily got quit of, but directed him to build one hundred and eight *Siva* fanes, and then at *Madhyáranya* he would be relieved. He accordingly built a shrine every day, not eating till each day's work was done: but he did not know where *Madhyaranya* was. At length he found an emblem of *Siva* under a tree named *Madhi*; and *Siva* there appeared to him, directing him to build a temple, to enter at one gate, where the spirit would halt and would be imprisoned, and to go out at a gate on the opposite side: which the king did, and was cured. He, however, died childless, and his queen followed him. There was no *Chola* king after him; he reigned fifty-five years. The above things concerning him were compiled by *Chacrátaiyengar*, a *Vaishnava Brahman* of *Melur*, from the *Bakhti Vilasam*, and some otherbooks, inclusive of *St'hala Mahatmyas*, or temple legends.

Remark.—Fable and fact appear to be blended in the first portion of this account; the latter portion explains and illustrates some parts of

the Madura *Puranam*, and from the comparison of the two a few historical facts may be gleaned with some measure of certainty. It is to be noted that this (according to the MS.) last of the *Chola* race, made *Combaconum* (twenty miles N. of Tanjore) his capital. This is the first document I have as yet met with, stating that fact; though I always thought that *Combaconum* must once have been a metropolis, from traces remaining.

Section 3.—An account of the *Yánádu-jati*, or wild people of *Sri-hári-cotta*, received from an old man of that tribe.

Of old, one named *Raghava*, brought with him sixty families from *Páca-natti* district, and located himself with them at *Sri-hári-cótta*, and clearing the country, formed *Raghava-puram.* The people by degrees spread through a few adjoining districts. A *rishi* who came from *Benares*, and was named *Ambiké svarer*, resided in *Mad'hyaranya* (or the central wilderness); and there, daily bathing in a river, paid homage to *Siva.* These wild people, of their own accord, daily brought him fruits and edibles, putting them before him. At length he enquired of them the reason, they replied that their country was infested by a terrible serpent, and they wished to be taught charms to destroy it, as well as charms for other needful purposes. He taught them, and then vanished away.

These wild people, being skilful in magic, continued in the forest. They are of four classes:—1. Chenju Vandlu.—3. Coya Vandlu.—2. Yana dulu.—4. Iralu Vandlu.

The *Yánádu* people are skilful in medicine. The *Cóya* people reside to the westward in the wilds at *Gooty*, *Athavani*, and other circumjacent places. Within their forest boundaries, if any traveller attempt to pluck fruit from any tree, his hand is fastened to the spot, so that he cannot move; but if, on seeing any one of the *Coya* people, he calls out to that person explaining his wishes and gets permission, then he can take the fruit and move away, while the *Coya* forester, on the receipt of a small roll of tobacco leaf, is abundantly gratified. Besides which the *Coya* people eat snakes. About forty years since, a *Brahman* passing through the district, saw a person cooking snakes for food, and expressing great astonishment, was told by the forester, that these were mere worms; that if he wished to see a serpent, one should be shewn him; but that, as for themselves, secured by the potent charms taught them by *Ambiké svarer*, they feared no serpents. As the *Brahman* desired to see this large serpent, a child was sent with a

bundle of straw, and a winnowing fan, who went accompanied by the *Brahman* into the depths of the forest, and putting the straw on the mouth of a hole commenced winnowing, when smoke of continually varying colours arose, followed by bright flame, in the midst of which a monstrous serpent, having seven heads, was seen. The *Brahman* was speechless with terror at the sight; and being conducted back by the child, was dismissed, with presents of fruits, and proceeded to the north. This circumstance occurred among the *Coya* people of the woods, or wilds, to the northward of *Pala-Vamchcha b'hadráchalam* in Sal. Sac. 1635. (A. D. 1712-13).

The *Chenju* people live to the westward of *Ahóbalam, Sri-Silam* and other places, in the woods or wilds, and go about constantly carrying in their hands bows and arrows. They clothe themselves with leaves, and live on the sago, or rice of the bamboo. They rob travellers, killing them if they oppose. " This people afflict every living creature"—(Kill for food is supposed to be meant).

The *Irala* people carry bows and arrows, and wander in the forests. They are thieves. The *Yanadu* class alone do not plunder, they are employed as watchmen; they collect a kind of bark and roots, used for dyeing red, bringing heavy loads, and receive whatever the *Sircar* is pleased to give in return. They chiefly live on a kind of white root, and wild honey. The *Sircar* employs them as watchmen. In the woods near *Sri-hári-cotta* there are forty of these *Yanadu* people (supposed to be heads of families). The *Sircar* gives to the headman of these people twelve *marcals* of rice monthly; in return he delivers sometimes ten bundles (each 500-lbs.) of the dyeing bark. The others who do not carry on this intercourse, live in their own manner in the forest on white roots and honey. This handful of *Yánádu* people seem to be comparatively separated; for if they attempt to hold intercourse with others of that tribe, at a distance, they are killed, and their wives are carried off; the others hold no intercourse with them. Such, as far as could be obtained is an account of these *Yánádu* people obtained from *Járámárudu,* as far as he could give information.

Remark.—This paper was read over by me a year or two since, without any other remark than that there were people in the Peninsula, of whom Europeans had received little or no information. It now attracted attention, chiefly from its following the preceding papers, and from wishing to dispose of the entire book No. 31, without need of future reference. But reading it now after having had previously in hand the paper on the *Khoi-jati,* mountaineers of *Goomsoor* (Madras

Journal of Literature and Science No. 16) termed *Códalu*, in the *Telugu* paper therein translated, it appears to assume more importance than otherwise I should have attributed to it: for it seems that the proper term is neither *Khoi* nor *Códalu*, but *Coya-jati* (in the ordinary pronunciation to the ear very similar to the enunciation of *Khoi-jati*) and that they are a subdivision of a much larger body of people. I am confirmed in my supposition that the so-termed *B'heels* of the north in *Guzerat*, &c. are of the same kind of people, though apparently more closely analogous to the *Chenju*, or *Irala*, class. As regards the seeming absurdity of the bundle of straw and the large serpent, I am of opinion that this is an enigma, and covers some more recondite meaning. Having in the Mackenzie papers sometimes met with a fact plainly narrated, and in others veiled by fable, metaphor, and symbols, I have learned not hastily to dismiss such seemingly crude orientalisms, but to try to look through them; and, in this instance, without pretending to solve what I am tolerably sure is a symbolical statement, I would throw out the conjecture, whether it do not allude to the *Meria pujai*, or human sacrifice, which may possibly be the charm on which these *Coya* people relied, and which they may have practised as well as the savage inhabitants of the mountains of *Goomsoor*.

The locality of *Sri-hari-cotta* is about twenty miles northward of Pulicat; the country about Gooty stretches thence N. westward; but *Sri-sailam* is further to the north. These savages are found in the *Goomsoor* wilds and mountains, and from personal information received by me, there is a very similar kind of people dwelling in the woody mountains of the Dindigul province to the south. In the persons of the *B'heels* they dwell on the *Vindya* (or *Bhind*) mountains; and I have, in the paper before alluded to, shewn it to be probable, that they inhabit the *Baramahl* hills to the north of the *Behar*. The account of this people as carrying bows and arrows, living on roots, honey, or reptiles, agrees with intimations throughout the more local papers of the Mackenzie collection, and with current fables as to the *Vedars*, who seem to have been wild savage people, aboriginal when the Hindus first began to colonize it from the north. Thus we have a somewhat wide range of data, for inductive evidence, in favor of this particular kind of people under various subdivisions, having been the primary dwellers in the peninsula. The conclusion need not for the present be drawn; but it is clearly indicated; to be followed, possibly, by other equally plain steps of historical deduction, arising out of the Mackenzie papers, by the aid of patience and perseverance. The

point once established, that the *Hindus* are not the aboriginal native inhabitants of the peninsula, does not seem to me of trifling magnitude; and this point, I expect, will be fully proved in the process of the present investigation.*

C.—MALAYALAM.

Manuscript book No. 3.—Countermark 896.

Section 5.—Kérala Ulpatti. An account of the *Kérala*, or Malayálam, country.

This manuscript is stated to be copied from one then in the possession of Dr. Leyden: the following is a brief abstract of the contents.

Invocation.—The incarnation of *Parasu-ráma* and his destruction of the *Cshetriyas.* He formed the *Kérala-désam,* which being infested with serpents, he introduced the *Arya Brahmans,* and located them in sixty-four villages. Minor details of internal arrangements. *Parasu-ráma* procured from *Indra* the grant statedly of six months rain in the year. Other details concerning the classes of *Brahmans,* and their offices. The *Brahmans* at first conducted the government on the principles of a republic; but, not agreeing among themselves, and disputes about property arising, *Parasu-ráma* determined that it would be better for the country to be governed by a king; and one was selected born of a *Brahman* father, by a *Cshetriya* mother; thus combining *Brahmanical* and kingly descent. He was first settled in the *Kerala* division, whence arose the name of *Kerala-désam;* but the entire Malayalam country was originally divided into four districts—*Túluva, Múshica, Keralam, Cúva,* the latter on the extreme south. Details of the villages. At a late period in the *Cali-yuga* the *Baudd'has* came to *Kérala-désa,* and the king *Chéruman Perumal* learnt from them their mode of religious credence. Being favorably inclined to them, and having adopted their system, he intimated to the *Brahmans*

* A note, by the President of the Committee of Papers, on this portion of Mr. Taylor's Report, is too curious to allow of my omittin‹g› it:—" I am quite certain that this is an account of the wild people on the Pulicat Lake in the Zemindary of Sri hari cotta, whom I saw many years ago caught like monkeys by the peons of the Collector. The women could not count more than 4 or 5 and said (with their infants in their arms) that they (the mothers), were only 3 or 4 months or years old! They had no notion of time, still less of religion—I have no doubt they are similar to the Bheels and Gonds; but they are certainly *not,* like the Gonds, cannibals."—A. D. C.

For the information of readers at a distance, unacquainted with the localities hereabouts, it may be stated that Pulicat is only 23 miles from Madras, the Capital of S. India! What bewildering reflections regarding the human race does this strange fact call up! And how surprizing are the circumstances of our isolation among the tribes of India, one of them, at the very threshold of the long established seat of our power, and within sight of the manifestations of our civilization, so little elevated above the brute creation!—*Editor.*

that they must unite with the *Baudd'has*, and follow their system. The *Brahmans* were greatly alarmed, and incensed; and consulting with a leading individual among them at *Tri-carur*, he promised to remove their difficulties. Following his advice, the *Brahmans* went to the king, and remonstrated with him, calling for a public disputation, when if they, the *Brahmans* were vanquished, their tongues should be cut out, and the like done to the *Baudd'has* if these should be overcome. The dispute was held; terminating favorably to the *Brahmans*, in consequence of a magical influence emanating from the head *Brahman* at *Tri-carur*. The tongues of the *Baudd'has** were cut out, and they were banished the country. The king who had adopted their system was dethroned, and some lands were set apart for his support. He is not the *Cheruman Perumal* who went to *Mecca*. His son was crowned; and an oath was taken from him, never to permit the *Baudd'has* or people of any other religion to obtain public sanction. Other details of some subsequent matters are given. At later periods, when the above oath had fallen into desuetude, the *Baudd'has* (Mahomedans) obtained some footing in different places. The system of *Battacharya* obtained in the *Malayala* country; and the *Vedantists*, of that class, received some endowments in lands. At an assembly of the *Brahmans* of the sixty-four villages, it was determined that only the *Brahmans* of eleven villages (or village districts) should possess the right of offering a particular species of *yogam*, or sacrifice, and of performing some other special ceremonies. In process of time the rule of kings had become extinct; and some *Brahmans* went to *Crishna-rayer* inviting† him to take the rule of the country. He sent two persons respectively named *Athi-raja Perumal*, and *Pandiya-raja Perumal*, as his viceroys, each for a period of twelve years. After them *Cheruman Perumal* was sent, who was welcomed by some distinguished persons, safely conducted, and duly installed. He ruled thirty-six years, being three times the appointed period, on account of his good qualities. The Rayer however was not satisfied with this extension of the term, and determined on hostilities. *Cheruman Perumal* took counsel as to the best means of meeting the invasion. In the first place two *Brahman* ambassadors were sent to the *Rayer* to endeavour to pacify him; but

* In Malayalam it seems that the Mahomedans are termed *Baudd'has*. The *Syrian* Christians are called *Marga-carer* "people of a way," but are never designated *Baudd'has*. Such a use of the last term as applied to Mahomedans, is, I believe, peculiar to the Maliyala country.

† He more probably conquered the country, without any special invitation.

he refused to listen to them. A little fable is narrated of the manner in which the messengers acquired a magical quill, by looking through which the real nature of any being would be discerned. The *Cheruman* in connexion with the *Calicut raja*, and other subordinates, assembled a great army, and while the multitudes were asleep, by looking at them through the quill, it was perceived that 10,000 were men, 30,000 gods, and the rest *asuras*. To the ten thousand a distinctive mark was affixed: and with them the *Rayer* was encountered, and defeated.

The birth of *Sancaracharya* is then narrated, with his proceedings as to the different castes of people, and the regulations established by him, accounted for in rather a fanciful manner; but it is stated that his regulations continued to be observed. *Cheruman Perumal* continued to rule. A *Nayar* was killed, who, after death, is represented as instructing the king to attend to the lessons of a *Jonaca* (Mahomedan) teacher, according to whose advice he might embark on board ship, and would thereby attain a partial beatification. He* divided his whole dominions into eighteen portions, which he gave over to the charge of different chiefs. The two ambassadors by whose means the *Rayer* had been conquered, each received portions of country. He specially gave a shield to the Calicut *raja*. *Cheruman Perumal* then went away (by sea) to the country termed *Issa* (supposed to designate Arabia). The Calicut *raja* afterwards waged war with the various petty chieftains, conquering some of them, and acquiring superiority.

The arrival of the Portuguese at Calicut is noticed, and the Calicut *raja* is said to have fought with the captain. The *raja* ruled over eighteen forts, and seventeen districts. He fought continually with his neighbours, the Travancore and Tellicherry *rajas* being excepted: he subdued many countries: exaggeration appearing in the enumeration of them. He acquired pre-eminence above other kings. The customs of the *Calicut* kingdom are then narrated with laws regulating interest and profit. The commencement of the *Collam* era is thus accounted for. The rule of the viceroys of *Vijayanagaram* had been fixed at twelve years, corresponding with the revolution, in orbit, of the planet Jupiter. But, as *Cheruman Perumal* exceeded the prescribed time, this mode of reckoning fell into disuse. In a period of great scarcity and drought, when a large reservoir (*Collam*) had become quite dry, the *Brahmans*, in a body, went to the *Calicut raja*, and represented that the cause was his withholding the customary largesses to the gods, and the *Brah-*

* This is the *Cheruman Perumal* who is said to have adopted the Mahomedan religion, and to have gone to Mecca.

mans ; the *raja* acknowledged his fault, and promised to repair it. As a commencement a great number of *Brahmans* were fed in the dry bed of the tank, and before they had finished eating, the water rushed in with such rapidity, that they were obliged to make their escape without having time to take away the leaves on which their food had been eaten. An era was begun to commemorate this event, being the *Collam* era. Matters relating to the cultivation of cocoanut trees, betel-vines, &c.— Customs in dealings—buying, selling, &c.—rules to regulate hunting. Origin of the *Nayars*: also of a kind of divinity derived from the fable in the *Mahabharata* of *Siva's* appearing to *Arjuna* during his penance near the *Himalaya* mountains. The origin of the *Ayinar* born from *Siva* and *Mohini*. The names of various local *numina* in the *Malayala* country are given. Names of various fanes in that country. Besides which the thirty-three crores of inferior gods, and the sixty-six thousand *asuras*, are all said to have been in *Malayalam* ; together with the superior gods, protecting the country.

Afterwards the names of the *Calicut rajas*, and other inferior chiefs are given. The story of a *Jonaca* (Mahomedan) who came to this country ; the cause of which is narrated—the foreigner extended the dominion of the *Calicut raja*. Magnificent things are stated as to the conquests of the *Calicut raja*, originating in his devotedness to *Sri-Bhagavati*, and her gifts to him. Notwithstanding the foreign Europeans came and took possession of Calicut ; whom, however, in the end, the *raja* defeated. The *Curumbars*, of the hilly district, greatly helped, and had districts given in consequence. Disputes between this *Curumba* chief, and the Cochin *raja*. Details of the number of *Nayars* belonging to different parts of the country. Reference to the regulations made by *Parasu-rama*, and confirmed by *Sancarácharya*, as to the distance which must be observed by different castes in their approach one towards another, the distance in feet being minutely stated. *Brahmans*, and cows, are of good birth ; other classes of men, and other animals not so. With these regulations as to personal distinctions, and caste observances, the account concludes.

Remark.—The writing of this document was in one place very much faded. As it is one of the best of the few *Maylayálam* MSS. it has been restored ; and its entire translation is recommended, notwithstanding that it contains some things puerile, and some absurd. Still there are real historical details ; and these can always be best selected, after that the whole evidence of any document, whether important or trifling has been fully and fairly brought into view.

D.—MAHRATTI.

Manuscript book No. 6.—Countermark 918.

An account of kings of the four ages, and specially of the *Mahratta* kings of *Sattara.*

An account is proposed to be given of the four ages, the kings of *Hastinapuri*, the *Mahomedans*, the *Maharashtiras*, and *Bhosalas*. The narrative is professed to be received from *Vitala Svami*, an incarnation of a portion of the divine essence near *Sattara*. Mention of the incarnations of *Vishnu* in different ages. With a brief reference to other kings, the line of *Yudisht'hira* is given. Then the ancient line of the *Bhosala-vamsa*, ruling for 1330 years. A further list of the line of *Yudisht'hira*. *Jeyh Sinh* from the Bengal country made great conquests. Various other kings. *Narada Sinh* is said to have ruled at the commencement of the era of *Salívahana*. The race of *Narada Sinh* is given. In Sal. Sac. 500 the *Padshah* is said to have ruled in *Hastinapuri* (Delhi). The *Sultans* of this race protected the *Maharashtiras*, and gave them lands to the southward of the Nerbudda river. Some little matter is given in the Balbund character. The *Padshah's* instructions to the *Mahrattas*, as to tribute and duties. The instructions of the great *Mahratta* (i. e. the *Bhosala*) to his tribe and dependents, as to the manner in which they were to govern so as to fulfil the *Padshah's* wishes, and not to oppress the accountants, or people. A list of the *Bhosala* race. A request made by the *Divan* (or *Peishwa*) to give him a grant of land. The *Bhosala* pointed out the neighbourhood of *Poona*, and gave him a grant of land there subject to quit-rent, or tribute. Subsequently the *Divan*, named *Baji Rao*, did not send tribute to the *Bhosala* ; on which account the latter wrote two or three letters. The reply was in substance, that as the *Bhosala* derived his possessions from the *Padshah*, so he, *Baji Rao*, owed him, the *Bhosala*, nothing ; but that the tribute must be given to the *Padshah*. Both parties appealed to the *Padshah*; in consequence of which appeal, an order came to the *Bhosala*, directing him not to interfere with the *Divan*, and that tribute from the latter must be sent to the *Padshah*. The *Divan* did send tribute for a short time, and then discontinued doing so. In consequence the *Padshah* sent a detachment of troops to demand the stated revenue ; but the officer was put off with various ex-

cuses. Meantime the troops killed every day twenty or more cows, on which the *Divan* remonstrated, and wrote to the *Padshah*, who replied, that it proceeded from his refusing to pay his tribute, which if he did, the annoyance would be withdrawn. The *Divan* requested a small portion of land to be bestowed on him in free-gift, or fee-simple, wherein he might carry on the rites of his religion without molestation. The *Padshah* consented, bestowing on him an *inam* grant; and restored all the remainder of his former possessions to the *Bhosala*, as a tributary. The *Divan*, within his small district, strengthened himself by degrees; and, assembling troops, at length ventured on making war on the *Bhosala*; who, being occupied chiefly in peaceable duties and depending on protection from the *Padshah*, kept up no great standing army; as a consequence he was attacked by the *Divan*, taken prisoner and carried to *Poona*. As the *Divan* obtained great plunder, and wealth from the *Bhosala*, so he greatly increased his army therewith; and when the *Padshah* assumed hostile demonstrations, he sent word to say, that the country south of the Nerbudda was fitting to be ruled by *Brahmans*, that he, the *Padshah*, need give himself no trouble, for whatsoever tribute was demanded should be remitted. The *Padshah* relaxed on receiving this message; and consented to receive tribute. The *Divan* accordingly had accountants prepared in the different languages of the country, being *Guzerati*, *Balbandi*, *Mahratti* and *Canarese*. *Baji Rao* now sent messages to the *Guicowar*, to *Scindiah* and the ruler of the *Congama* country (the *Konkan*) calling on them for allegiance and tribute, in which case he would protect them, seeing that he held his authority by sanction of the *Padshah*. The consequence was a war with the *Congama* country, which he conquered; and next the conquest of the *Guicowar*, the ruler of *Guzerat*. The ruler of *Visiapur* hearing of these proceedings determined to make war on *Baji Rao*, to humble him, and to assume his country. This he did and began to rule over that country in Sal. Sac. 1610 (A. D. 1687-8). The name of his viceroy was *Shahoji*. Other changes and revolutions followed. One named *Ram Singh* obtained a temporary ascendancy; but the *Visiapur Padshah* sent an army, and overthrew him, and subsequently re-instated the *Bhosala* as a tributary. His name was *Sivaji*. Other wars followed. List of *Rajas* of the *Bhosala* race, who subsequently ruled; with the period of each ones rule. The *Colapur raja* meantime protected the posterity of the before mentioned *Baji Rao*. A number of *Zemindars*, or persons who had received benefits from *Baji Rao*, were as-

sembled ; and counsel was held as to the means of raising an army to go against the *Bhosala*, and reinstate the descendant of *Baji Rao.* An application was made by him to Bombay for help, from the English there, in Sal. Sac. 1635 (A. D. 1712-13) stating his prior claims to the country, now governed by the *Bhosala.* It would appear that they gave assistance. The descendant of *Baji Rao* then addressed a memorial to the *Padshah* stating his claims ; a copy of which, at length, is given. It is verbose in details of preceding matters ; assuming, in part, somewhat the air of a manifesto, demanding at least the restoration of the small *enam* grant, or independent territory, before given to *BajiRao*, or else with the aid of the *Colapur raja*, and other auxiliaries, the memorialist would be prepared to make war for the recovery of his patrimonial inheritance. This memorial was written in Sal. Sac. 1572(A.D.1659-10). On the despatch of the memorial, the writer of it set out at the head of 25,000 men to attack the ruler of *Visiapur*, halting at the village named *Visala-gadda*, whence a few troops of the *Padshah* retreated. The *Visiapur Padshah* went, it is stated, to *Goa*, giving instructions to his respective chiefs ; especially to the commander at Aurungabad. The minister of the young man, named *Nana Farnis*, interposed his counsel, to the effect that the *Visiapur Padshah* was too strong for him ; that the concentration of troops forming at *Aurungabad* would render it inexpedient to go against *Visiapur* itself ; and that it would be better to proceed against the *Bhosala rajah* of *Sattara.* This counsel was followed. The army was made to retrogade ; and was turned towards the latter place. *Dil Ali Khan* came to the assistance of the *Visiapur Padshah* with 60,000 troops, from the *Padshah* of *Baganagur* (Bisnagur ?) The young man was greatly intimidated by the arrival of this auxiliary force. He divided his army into two divisions, proceeding with 13,000 against *Sattara*, and sending 12,000 into the *Congama* country, (the Konkan) ; which latter was conquered, and brought under revenue management. The *Sattara Bhosala*, fearing to encounter the invaders relinquished the country, and gave it up to them. The descendant of *Baji Rao* in consequence gave to the *Bhosala* a small territory, to hold as a feudatory ; on the condition of being ready to do military service whenever summoned. His title was still to be *Sivaji Bhosala Maha raja.* The descendant of *Baji Rao* soon after died. He had no child, but his wife was pregnant, and under the instructions and guidance of *Nana Farnis*, a regency was formed *ad interim.* A transition is then made to the race of the aforesaid *Bhosala* ; their names, dates, and periods of rule, being given. Details of

their donations, and endowments of shrines. The before-mentioned wife of *Baji Rao's* descendant was delivered of a son, who was named *Panda Pratana Baji Rao* ; great rejoicings were made, and the government was conducted by *Nana Farnis.* A woman of the same race named *Gangi Bhai* had a share in the government. The young man on coming to 16 years of age was installed, and named *Simandar Baji Rao.* He had some English auxiliaries in his pay, and made conquests in the neighbouring *Congama* and *Telinga* countries. He established *Doulet Rao Scindiah, Holkar Rao,* the *Guicowar,* and also the *Bhosala* as subordinate chiefs ; the authority descending to their posterity. He himself maintained a standing army, as stated, of a crore, or ten millions (that is to say a large army).

The preceding account was written by *Appaji* of Mysore in A. D. 1806; and finished on the 12th April at Poona.

Remark.—It will appear from the above abstract, that the document to which it refers is of considerable relative importance towards illustrating the history of the Mahrattas, from the time of their origin. I would defer stating anything with reference to full translation, until the various documents in the Tamil language, some of them of great length, and much detail, bearing on the history of Mahrattas, have undergone a more full examination by me. The present document can be referred to at any subsequent period. The manuscript book containing it, was damaged and in rapid progress towards decay ; on which account, as well as from the presumed value of the contents, the document has been restored.

E.—SANSCRIT.

(*Grant'ha* character).

Palm leaf book, No. 236.—Countermark 1044.

Chatur Vimsati Puranam.

Inv cation.—A brief indication of the contents, then a reference to the author, and to his readers. The *Purana* is derived from the supreme lord *Paramesvarer* ; its virtues and beneficial tendencies are announced. Great virtues of its writer : great advantages will result to its readers.

The *Purana* opens with a reference to *Vrishab'ha Svami,* who lived in the centre of the southern portion of the land of *Baratha* in *Jambu*

dwipa (central Hindustan). An early *Chacraverti* (or ruler) came to him and begged to know all customs, differences of times, and other matters from the time of *Susuman*. The *Svami* favourably received his request, and taught him the *Mulatranta*, or principal system, which was delivered by *Gautama* to *Srenica* the great king, and consisted of 455, 442, 003, 100, 530 stanzas. This, the great *Purana*, is taught from age to age. The account is then conducted as if repeating what *Gautama* stated to *Srenica*. A specification of the various *yogas*, that is religious rites or modes of worship. A reference to *Svayamb'huva Manu*, and the matters which occurred in his time, introducing the mention of the *Ulsarpani* and *Avasarpini* periods; the former prosperous as following the renovation of all things after the periodical deluge; the latter adverse, as going before and preparing for the destroying and purifyng deluge (see MS. book No. 12 section 1). The peopling of the *Baratha-candam* or (continent of of India,) with the *Manus, Chacravertis*, and people, is next adverted to. The prompt justice and equity of the *Chacravertis* in the punishment of crime. The book then mentions various matters concerning the world, countries, towns, kingdoms, sacred rivers or pools, donations, penance, in detail. In those times men believed in only one Creator, who created men good and evil, not according to his own purpose of mind, but according to their good and evil deeds in a former state of existence. Afterwards the bounds and the nature of the *Baratha-candam* (or upper India) are stated, its hills, peaks of mountains, &c. The great city of *Alacapuri*, on the northern portion, its ruler was *Athi-palen*, king of the *Vidyádharas* (a species of celestials): he considered the luxury of kingly rule to be like smelling a poisonous flower; and relinquished the kingdom, devolving it on his son: becoming a naked *ascetic*, he was initiated into the *Jaina* system. Details are given of that system. *Mahapalen* governed; he had four ministers, two of whose names were *Maha-mathi* and *Svayamputti*. One day *Svayamputti*, being a distinguished person among the *Jainas*, asked the king some questions of a religious character, to which the king replied; and they both agreed, that though the body dies, yet that the *Jivan* (life or soul) does not die. A story is narrated in illustration, to the advantage of the *Jaina* system. Various accounts are given of persons who by evil actions incurred the pains of *Naraca* (or hell). Description of the various places of torment, and the punishments inflicted: being instructed, or purified, thereby, the persons so punished subsequently attain to happiness. Mention of persons who obtained

beatification in the *Isana-calpam.* There follow details of capital towns, each the metropolis of a state or kingdom. Prophetic declaration as to the future birth of *Vrishab'ha-svami*—his incarnation.—*Brahma* and other gods did him homage; many matters follow concerning that incarnation and its praises; an account of the instructions given by *Vrishab'ha-svami,* seated on a lofty seat or throne; *Baratha* and others received his lectures. An account of their panegyric on the teacher. The glory of the *Jaina* system dwelt on. The *Chacraverti* afterwards returned to *Ayodhya,* and received homage from the *Vidyadharas.* In a dream he had a vision of the god, who announced to him that persecutions and sufferings would arise from the *Pashandis* (a contemptuous epithet applied to the *Saivas*) and also from the *Mlechchas* (outcasts or barbarians) detailed at length. The *Chacraverti* in the morning performed the rite of ablution, in order to remove the evil of the dream, or to avert its accomplishment. Details of *Probasan, Cumbham,* and many others, are given, as coming from the mouth of *Gautama,* delivered to *Srenica;* that is to say of what kind of birth or form of being, they before were (on the system of the metempsychosis), what kind of actions they performed; afterwards, being instructed in the *Jaina* system, they acquired beatification. These various accounts, in much detail, occupy the rest of the work.

Note.—This palm-leaf manuscript on examination was found to be complete, and in good order; with the exception of about fifty leaves at the beginning. These were restored on other palm-leaves, and added to the book, for its more certain preservation.

The work it will be seen carries up the origin of the *Jaina* system to the very birth of time; yet as the whole turns on the alleged incarnation of *Vrishab'ha-svami* (considered by some to be a subordinate incarnation of *Vishnu*), and as *Vrishab'ha-svami* was posterior to *Gautama Budd'ha,* the evidence for such high antiquity may receive as much credence as any one may choose to bestow. In truth the *Jaina* system, at its origin, was a modification of the *Vaishnava* one. To me it seems that the *Pali* work (about to be published in Ceylon) entitled the *Mahawanso* (or great genealogy) clearly fixes the origin of the *Baudd'ha* and *Jaina* systems at *Magadha*; three or four hundred years antecedent to the Christian era. Nothing in this work, as it seems to me, contradicts such an origin; without being easily reconcileable thereto. The entire book might be worth translating, at some future period; for though the *Jaina* legendary history is as much beclouded with metaphor and fiction as the *Brahmanical;* yet, from a compari-

son of the two, facts may be selected which could not be received on the evidence of either one of the parties.

Professor Wilson's notice of this book (Des. Cat. vol. 1, p. 152), is as follows :—

" VI.—Chaturvinsati Purana.

" Tamul language and character. Palm leaves.

" An account of various sovereigns, peculiar to the legendary history of the *Jaïnas,* who flourished contemporaneously with the twenty-four *Jainas* as *Vidyádhara, Mahábala, Vajra bahu, Vajragarbha, Nabhi, Vrishab'ha, Bharata, Anukampana,* *Sripala, Samudravijaya, Srishena,* &c. In three books, by *Virasoma Suri.*"

The statement of this book being in the Tamil language and character, must have been an oversight of Professor Wilson's assistants. It is a *Pracrit* (or unpolished Sanscrit) work, of the kind sometimes denominated (by natives of other provinces than the Tamil district) the Tamil *Grant'ha ;* the term *grant'ha* not then denoting merely *a book,* but a *Pracrit* work, both in letters and language.

CONCLUSION.

In this report I have not included all the works that have been the subject of examination, collation and restoration, during the brief period of two months to which it refers; but only so many as would suffice to form a primary volume of restored documents : of which moreover I could get the abstracts written over, from my rough notes, in sufficient time; and the preparation of an abstract forms to me not the least laborious part of the duty. Such MSS. as for the present lie over, I purpose to include within a following statement.

II.—*Sketch of the Malayan Peninsula.—By Lieutenant* NEWBOLD, *23d Regt. L. I.,—A. D. C. to Br. Genl.* WILSON, C. B.

Geographical position.—The Malayan Peninsula, properly so called, extends from lat. N. 8° 9′ to lat. 1° 22½ N. where it terminates at Point "Romania," or, more correctly speaking, *Ramunia*, the most southerly land of continental Asia. To the north it is connected with the great continent of India, by the isthmus of Kraw; which, according to Forrest, in its narrowest part does not exceed 97 miles across from sea to sea. He states that by this isthmus an overland intercourse for the conveyance of letters to and from China might be established, which would obviate the necessity of going round Point *Ramunia* by the straits of Malacca and Singapore; there being a navigable river on the west side, where the portage is but six hours from another river, called the Tomfong, which falls into the gulf of Siam near the Sarchin Islands. Natives of this part affirm that a canal might easily be made across the peninsula connecting the bay of Bengal, with the China seas, by joining the two rivers. This is a subject well worth the attention of Government. The part of the peninsula actually under Malayan sway is that comprised between Point *Ramunia* and the sixth degree of north latitude, where its political power is bounded by the *T'hay* or Siamese empire. Its eastern shore is washed by the China seas, and its western side is separated from the large island of Sumatra, by the straits of Malacca, through which, and the straits of Sunda, flows the great tide of commerce of the eastern and western extremes of the globe. The breadth of the peninsula is from 50 to 150 miles, and length 450. Its direction, south-east.

Physical aspect and Geology.—The surface of the Malayan Peninsula, on each side of the primitive mountains that run down its centre, is undulating towards the coasts. It is shaded by primeval forests, stored with treasures to the naturalist and botanist, and a profusion of tropical verdure, the result in part of the moisture with which the atmosphere and soil is charged. Small plains covered generally by long grasses, occur in positions whence the moisture happens to be drained; while the flats that wind among the low hills are swampy, and frequently covered with water to a considerable depth. Where these flats lie in the course of rivers, lakes are formed, sometimes of considerable extent; as that of *Braugh*, lying near the centre of the peninsula be-

tween Malacca and *Pahang.* Rivulets and springs are every where abundant. A few large rivers, having their sources in the mountainous chain above-mentioned, empty themselves into the seas on either side. Their banks are generally low, swampy, and covered with mangrove, *Nipah, Nibong* and other trees. Their bottom is for the most part muddy, except at short distances from the estuaries, where sand banks and coral reefs are often met with. Their mouths are frequently obstructed by bars augmenting or decreasing according to the operation of tides, freshes and oceanic currents. The principal rivers on the west coast are those of *Quedah, Perak, Singie, Muar,* and *Batta Pahat,* or Rio Formoso, that of *Johore* at the southern extremity, and those of *Pahang, Basut, Tringaun,* and *Patani* on the eastern shore. A number of verdant islets stud the coasts, among which are the *Sancavi,* the *Pinang* the *Dinding,* the *Sambilan,* the *Aroe,* the *Aguada,* the *Singapore,* and *Tinghie* clusters. The southern part of the Malay Peninsula and Banca assimilate in geological formation. Dr. Horsfield, in his observations on the mineralogical constitution of Banca, observes that " the direction of the island being from north-west to the south-east, it follows not only the direction of Sumatra and the Malayan Peninsula, but the large chain of Asiatic mountains, one of the many branches of which terminates in Ceylon ; while another traversing Arracan, Pegu, the Malayan Peninsula, and probably Sumatra, sends off an inferior range through Banca and Billiton, where it may be considered to disappear."

This chain of mountains may be viewed as the termination of one of those beams or pillars of lofty hills, spoken of by M. de Guignes, in his work on the Huns, as supporting the stupendous edifice, to which he compares the elevated regions of Tartary, comprehending the lofty ranges of Imaüs and Caucasus ; and the dome of which is represented as one prodigious mountain, to which the Chinese give the epithet of celestial, down the steeps of which numerous broad and rapid rivers pour their waters. The Malayan chain, as far as has been hitherto explored, is of primitive formation, principally a grey stanniferous granite and clay slate. As it approaches the equator, it diminishes in height : the highest of the *Rumbowe* and *Johore* ranges not exceeding probably 3,000 feet above the level of the sea ; while many of those in the north of *Quedah* are said to be upwards of 6000. Mount Ophir, a detached mountain, between 30 and 40 miles to the eastward of Malacca, I calculated roughly (by means of the thermometer and boiling water) to be 5,693 feet above the level of the sea : its summit is of grey granite. Gold dust and crystals of quartz are found in consider-

able quantities around its base. It is confessedly the highest mountain in this part of the peninsula. In the gold countries of *Tringaun*, *Pahang*, *Gominchi*, &c. quartz rocks and crystals of the same mineral are met with. At the southern extremity of the peninsula, and in some parts of *Salangore*, prophyry occurs associated with granite. The Elephant rock in *Quedah* is a mass of cavernous limestone and calcareous *breccia*, containing fossil shells. About 16 miles inland runs a range of small hills of a fine grained sandstone.

According to Dr. Ward " the small hills in the neighbourhood of Malacca are formed of a conglomerate, the base of which is clay-ironstone, containing imbedded portions of felspar, in a state of decomposition (having all the properties of yellow ochre), and small grains of quartz and iron glance, scattered through its substance. The specific gravity of the rock is 2,536 ; when recently dug, it is soft, can be easily cut, and readily stains the fingers ; but after exposure to the air for some time, it acquires such a degree of hardness as to be broken with difficulty ; and its durability is shewn by the present state of the ancient buildings, which have stood unimpaired for nearly 300 years. In its dry state it is porous, from the destruction of the ochreous particles by moisture and exposure to the air, resembling old lava in its external appearance. In all its properties, it agrees exactly with the rock common on the Malabar Coast, and described by Dr. Buchanan under the name of laterite." The laterite formation is of great extent on the W. coast of the peninsula. It is found at Province Wellesley. I have seen it on the coast of *Salangore* and on some of the islets in the vicinity ; also at Malacca and *Muar*. It occurs likewise at the extremity of the peninsula, and at Singapore. The external conformaion of the low hills into which this rock rises resembles that of the ranges, lying between the foot of the Western Ghats and the coast of Malabar and Canara, smooth in outline with long flat or mammillary summits, never attaining any considerable height. This formation appears to commence at Fort Victoria on the Western Coast of India, partially fringing the shores of the Bay of Bengal, and running down the western side of the Malayan Peninsula. It probably extends also along its eastern coast,a knowledge of the geology of which is still a *desideratum*. Hornblende rock is found at a little distance to the south of Malacca, probably as a dyke in the granite ; but this I had not an opportunity of ascertaining. Some of the islets in the vicinity of Pinang are of a bluish grey limestone, containing pelagic fossil remains, as at *Pulo Sedah*, and resting on an argillaceous schist, both in strata dipping at a considerable angle.

This limestone has not hitherto been found in the southern part of the peninsula. I have seen traces of clay slate in the tin mines of *Naning*, and it is seen again in *situ* at the extremity of the peninsula. The matrix of the tin ore will be probably found at no great distance from the line of superposition, that is where the clay slate rests upon the granite. The islands in the neighbourhood of Malacca, and many of those off the eastern limit of the *Salangore* coast, consist of granite and sienitic granite, in some situations overlaid by laterite.

The following notes on the geology of the southern extremity of the peninsula and islets around Singapore, are deduced partly from a paper in the Singapore Chronicle, and partly from a paper* by Dr. Bland. The hill of *Johore* on the main is four or five hundred feet high—and consists of modifications of granite and hornstone, with beds of jasper. From this to Point *Ramunia* (twenty miles) is a dreary forest. Along the shore of a tongue of land, called Delhi Point, for the space of two or three miles, are strewed large masses of hard and vesicular *scoriæ* many feet thick, imbedding masses of silicious matter, in juxtaposition with indurated clay-slate in vertical strata. Dr. Bland found here a remarkable nucleus, which presented the appearance as if lava in a liquid form had been forced up from below with a gyrating motion; circular layers having different shades of colour, becoming wider, and more extended, and edging away into straight lines parallel to the other strata. At the N. E. point of a reef stood a fossil tree fifteen feet high, on a mass of a rock of argillaceous schist. Masses of coral, madrepore, bearing indications of igneous action, were seen scattered around and imbedded in the *scoriæ*. *Obin* isle, about six miles long, is of a small grained granite. At *Arah* on the main the granite formation ceases, and sand-stone and clay-iron-ore (laterite ?) occur. At *Arah* are large masses of decomposed felspar suited for the manufacture of the best porcelain. From the point of *Arah* to the point of *Pandas* on the main, about six miles, is a trace of sandstone, but at the latter place a small grained blue granite appears, or sienite. The corresponding coast of *Singapore* is also sandstone and clay iron ore (laterite) until we come to *Pulo Pergam*, where blue granite again occurs. Beyond *Pulo Pergam* again the formation of Singapore is red clay slate. *Pulo Marambang* is a small island chiefly composed of granite with overlying sandstone and clay iron stone. The formation of the Carimons exteriorly is chert or hornstone. Interiorly, near

* Journal Asiatic Society, Bengal, vol. 5, p. 575.

the tin mines, of granite with veins of white quartz. The general formation, granite with hornstone overlying. The coast rocky and precipitous. *Pulo Takung* is composed of clay iron or sandstone, and clay slate under the sandstone, soft and unfit for roofing—only found here and at *Pulo Saler*. The rabbit and coney rocks are two masses of sandstone. *Pulo Tinghi* on the east coast has a remarkably volcanic appearance.

From information hitherto collected, and from diligent enquiry made among the natives of the peninsula, I cannot discover that any volcanos exist in the interior; though the circumstance of numerous thermal springs, scattered over the face of the country, sufficiently testify the activity of subterraneous fires at no great distance below the surface. Severe shocks of earthquakes have been felt from time to time; but whether caused by violent eruptions from any of the volcanos on the opposite coast of Sumatra, or by under ground explosions there, or in the peninsula itself, which is near the line of one of the great volcanic belts, is uncertain. It has been already observed that large masses of *scoriæ* many feet thick exist at Delhi Point. Natives have traditions of the sudden sinking of mountains in the interior, and their sites being occupied by lakes.

There are thermal springs in the vicinity of Malacca: at *Ayer pannas*, near *Sabang*, and at *Sundi* in the *Naning* district. I have visited the two first places, and found the temperature of the water, at noon, of the springs at *Ayer pannas* to be 120° Fahrenheit, and at 6 A. M. 113½°. The temperature of the hot springs at *Sabang* was found at 6 A. M. to be 110°. The variation in the former instance is accounted for by the different temperatures of the atmosphere at the time of ascertaining the heat. The temperature of the springs in both cases, I found in several comparative trials to exceed that of the atmosphere by an average of 35° Fahrenheit. At the wells near *Sabang*, when the bulb of the thermometer was pushed into the soft vegetable mould at the bottom of the spring, the thermometer rose to 130°. The springs at both places are situated in swampy flats, the nearest hills are of laterite and granite. They average from 1 to 2½ feet in depth, and are discoverable from a distance by the steam, and odour that escapes. The water is of a pale bluish green tinge; from the bottom bubbles of air (probably sulphuretted hydrogen gas), ever and anon find their way to the surface, where they burst. Dr. Ward analysed a portion of the water from the springs at *Ayer pannas*, and found that, on slow evaporation in a sand-bath, 1000 grains of the water left a resi-

duum of eight grains of saline matter, principally muriate of soda, with a slightly bitter taste, indicating the presence of sulphate of magnesia.

The superposition of the rocks of the Malayan Peninsula follows that laid down by geologists. Granite occurs in uplifted masses in contact both with the primary and secondary formations; on it is found clay slate in which no organic remains have hitherto been discovered, resting in strata highly inclined; also laterite and sandstone. The period at which the igneous rocks were upheaved, if, following Elie de Beaumont, we may be permitted to form any estimate by parallelism of elevation, is contemporaneous with that of rocks of the same class forming the Ghats in peninsular India, and the principal ranges of Arracan, Pegu, Ceylon and Sumatra. Over the clay slate and grau wacké, lies blue limestone, in conformable, beds, as in some of the isles in the vicinity of *Pinang*, and sandstone, as at Singapore. Overlying the sandstone and sometimes resting immediately on granite, we find that singular rock, the laterite, in which I have not hitherto been able to discover any marks of stratification. Jasper and hornstone are found in beds in the granite. Porphyry and sienitic granite interposed in unstratified masses. The trap will be probably found in dykes cutting the granite. The strike of the argillaceous schist as observed at Saddle Island, follows the general direction of the peninsula, viz. S. by E. Both the clay slate and limestone dip at an angle from 45° to 65° from the protruded or plutonian rocks, as shewn in Dr. Ward's section of Pinang, Saddle and Kia Islands, indicating a prior origin to the convulsion by which the granite was upheaved. The foregoing will, I fear, prove a most unsatisfactory sketch to the geological reader; much remains to be done by careful observation and collection of facts, both here and in our other Asiatic possessions, before attempting to classify the formations of India with those of Europe. In the Malay Peninsula especially, great impediments exist to connected geological survey, from the density of forest, and closeness of vegetation. I will conclude by pointing out a few *desiderata* to the geological observer. First, the careful examination of that singular mass of limestone, the Elephant Rock, in the *Quedah* territory, with a view to the discovery of fossil remains. It was visited by Dr. Ward, who found, resting on the base of the limestone, a bed of reddish yellow, cellular, calcarious *breccia*, containing small angular portions of a deep red argillaceous substance, resembling that composing an island in the neighbourhood, *Pulo Sonsong*, with small shells and pieces of coral.

The red cementing substance is probably the red earth resulting from the decomposition of the limestone. It is noticed by M de Cristol, in his *Observations Genérales sur les Bréches Osseuses*, that, in all cases where the red cement occurs, the cleft is in limestone, or where matter may be washed from limestone. One of these pieces bore the distinct impression of a fossil shell, supposed by Dr. Ward to be a species of *Cirrus.** At the foot of a detached mass of the limestone he found, at an elevation of eight or ten feet above the level of the surrounding plain, a mass of shells, chiefly cockles, oysters, and a larger kind of muscle, which he describes to be connected together by calcarious matter, the interstices being filled with soft earth containing numerous smaller shells. The mass was of irregular shape, between three and four feet square, and about the same in thickness, perfectly superficial, and not connected in any way with the rocks near it. No appearance of strata of shells was discovered in the neighbourhood.

The rock is an insulated mass of limestone, close grained and of a dark smoke grey colour, perforated by stalactitic caverns of considerable size. It is situated about six miles from the coast, in an immense plain, bounded to the east by a small ridge of hills about sixteen miles inland, supposed to be composed of a fine grained sandstone. The soil of the plain is a whitish clay mixed with sand. From its general appearance, the low nature of the surrounding country, the existence of the shells in the *breccia*, and local tradition, Dr. Ward thinks that it was at one time surrounded by the sea, and at no very distant period. The nature of the fossil remains must determine this point. It does not appear that the stalagmitic flooring of the caves was broken up by Dr. Ward : this should be done in order to get at the silt, sand, gravel, or mud, in which organic remains have been usually found imbedded in the ossiferous caverns of Europe. The bottom of the numerous caverns, in the islets frequented by the adventurous birds' nest gatherers, might with advantage be subjected to a similar process. *Pulo Sedah dedarat*, a rock thus described by Dr. Bland, and indeed the whole *Lancavi* cluster, merit a more careful examination. This island (*Pulo Sedah*) lies off the *Quedah* coast, in sight of the mainland, and forms one of the *Lancavi* group. It is about one and a half miles in circumference and rises to the height of 4 or 500 feet, crowned by a castellated looking rock with perpendicular strata : the whole appears composed of limestone, having

* The Secretary of the Asiatic Society of Bengal, Mr. Prinsep, seems to think this supposed impression of a *Cirrus* might be that of one of Dr. Bland's species of Pterocyclos found on *Pulo Susson*, an island opposite Quedah. Asiatic Journal Dec. 1836, p. 784.

a considerable proportion of silicious matter deposited in it, with veins of quartz a few inches in breadth occasionally intersecting it. The general rock was found stratified, from one to three or four feet in thickness, lying at an angle of about 45° dipping to the eastward; all the surface, wherever exposed, is rough and uneven. Numerous caverns were found, whose roofs, not being so exposed, were more smooth, which caves have been evidently formed by the action of the waves impinging against the rocks, which action is still going on in certain situations. Some caverns were situated higher up, and not now exposed to the same agency. On the north side of *Pulo Sedah* are found large masses of the same rock, from 20 to 30 feet in length and breadth, and 10 feet in thickness, lying in juxtaposition, and no doubt originally deposited *en masse*, but, having been raised unequally, have been broken into their present form and appearance. These masses were found rich in fossil remains; quantities of testaceous deposits were seen in all directions partly above the general surface, undergoing disintegration along with the matrix in which they were imbedded. Of the fossil *nautilus* many were seen, also some which Dr. Bland thought *ammonites*; silicious cylinders, also a fossil spine, which, from the round cup-like appearance of the *vertebræ*, was probably that of a fish.

The next point to which I would call attention is the careful observation of the laterite at its line of junction with the rocks on which it is found resting, viz. granite at Malacca, and sandstone at Singapore, *Arah* and *Pulo Takung*; whether the strata of the latter rocks are horizontal or inclined; and whether there be any appearance of stratification, or fossil remains in the laterite, or if it ever occurs in the form of dykes in its associated rocks. The origin of this rock, igneous or detrital, whether it burst up from beneath the crust of our planet like the Salses or mud eruptions of South America, overflowing the surface like basalt, overlying trap or lava; or whether it was formed from the disintegration of the subjacent rocks, or the detritus of the elevated plutonic rocks over the base of which it is generally found, is a question still undecided in Indian geology. Mud volcanos are known to exist in Pegu. In the reports of the British Association for 1831-2, is the following passage in the report on geology, by the Rev. W. D. Conybeare. "We learn that primitive formations, in which granitic rocks bear the principal proportion, occupy not only the great Himalayan northern chain, but also three-fourths of the entire peninsula, from the vale of the Ganges below Patna to Cape Comorin; although these rocks are frequently

overlaid by a thin crust of laterite (a ferruginous clay considered as associated with the trap formation)." This opinion of Mr. Conybeare in regard to the igneous origin of laterite is evidently founded on that of Voysey, a name well known in Indian geology; who regarded laterite to have a common origin with greenstone, basalt and wacké, from the insensible degrees by which, he says, they pass into one another, differing only as to the degree of pressure to which they were subjected when under fusion.

The opinion of some later Indian geologists is in favour of its having resulted from the decomposition of granite, sienite, hornblende, and other crystalline rocks. I have little doubt however that essentially different rocks have been described under the name of laterite. The true laterite, first described and named by Buchanan, is that of Malabar and Canara, which I have seen between the western ghats or Cordilleras, and the coast, occurring like overlying basalt, in tabular and dome-shaped masses; as also at Malacca. I have seen a hand specimen of sandstone from Singapore, penetrated and shattered by the laterite. But whether it rises through the associated rocks by dykes or fissures, I have not hitherto had an opportunity of witnessing. As far as my own observation extends, no marks of true stratification or the presence of organic remains have been detected. The exterior of detached weather-exposed blocks of primitive greenstone of the western *ghâts* decomposes into a thin ferruginous crust, which might easily be taken for laterite at first sight; and I have seen veins and thin beds of a cellular hæmatitic iron ore traversing the gneiss of Mysore, which closely resembles some varieties of the true laterite. Dykes and organic remains should be diligently searched for, in order to set the question at rest: their not hitherto having been met with is by no means a proof that they do not exist. It must not be understood from what has been said above that laterite exists *only* as a *thin crust covering the granite*, and other rocks near the coast. I have seen it in the middle of both the Malayan and Indian peninsulas, composing entire hills, rising to the apparent height of four hundred feet. The Observatory at Trevandrum is said to be erected on a hill composed of a solid mass of it. At Beder it occurs on granite and passes into both wacken and basalt (Voysey). The laterite of the red hills near Madras is supposed by Mr. Cole to be of detrital origin. That of the Malay peninsula and contiguous islets resembles in mineralogical character, the rock of the Malabar coast is quarried in a similar manner, and was extensively employed by the Dutch and Portuguese, in

the construction of their forts, and for other architectural purposes, for which it is admirably adapted, from the ease with which it is cut and shaped, its durability, and its little liability to splinter from shot.

The next point that demands the attention of the geologist is the ascertaining of the strike, dip, cleavage, and dislocations of the stratified rocks, and their relative, conformable or unconformable state of superposition. He should carefully note whether the laterite ever rests immediately on the limestone, and take drawings and specimens of both rocks at the line of junction. Trap is supposed to exist in dykes in the granitic rocks, but has not yet been seen in *situ*. The sea has been observed to recede from the western coast of the peninsula; as it advanced upon the opposite coast of Sumatra, or are the lines of forecoast produced for the most part by the deposit of mud and detritus brought down by the numerous streams from the interior? An examination of the west coast of the peninsula, and approximating coast line of Sumatra, might be made, to ascertain whether there be any grounds for an old tradition of their once having been united. Observations on the influences of currents, freshes and the tidal wave can be made on the coast of the peninsula with great advantage. Accounts of the tin and gold mines will be found under the head of *Sungie ujong*, *Johole*, and *Mount Ophir.**

Area and Population.—The peninsula contains an area of about 46,000 square miles, and its population is roughly estimated, as follows, at 374,266; consisting in the states bordering upon Siam, of Malays, *Samsams*, and Siamese; and in the more southerly states, of Malays, interspersed with small colonies of Chinese, Chuliahs and Klings.

Exterior Native States.

Quedah and Ligore	50,000	corrected.
Perak	35,000	
Salangore and Calang	12,000	
Johore (including Segamet & Muar)	25,000	
Pahang	40,000	
Kemaman	1,000	
Kalantan	50,000	
Pringaun	30,000	
Patani	10,000	

* Vide Journal Asiatic Society, vols. 2, 4 and 5. Art. Mount Ophir, Sungie ujong and Johole.

Interior Native States.

Rumbowe	9,000
Sungie ujong	3,600
Johole	3,080
Jompole	2,000
Jellabu	2,000
Srimenanti	8,000
Aborigines scattered over the peninsula	9,000

British Possessions.

Malacca and Naning	37,706	census for 1836
Province Wellesley	46,880	census for 1835
Total	374,266	

This does not include the population of Pinang, Singapore, and other islands off the coast. The population of *Quedah*, before the Siamese invasion, was estimated by Captain Glasse at 100,000 and that of *Patáni* at 90,000. These fine provinces now contain little more than one-eighth of their former inhabitants, and this remnant in a wretched state. The *Samsams* are a race of Malays who have adopted the religion and language of the Siamese. The Siamese are supposed to occupy that part of the peninsula that extends from the gulf down to 7° N., from *Trang* on one side to *Sangora* on the other, where the Malay population commences, but of late years they have encroached much further south, driving the Malays from *Quedah* on the W. coast, and from *Patani* on the east, the most fertile of the Malayan states. The Siamese it is well known are followers of *Budd'ha.* They are divided into two races, the *T'hay* and the *T'hay J'hay.* Their national name is *Shan* corrupted into Siam. They are a busy, vain people, deceitful, and cruel, though industrious and enterprizing. In *Salangore*, a colony of *Bugis* from the great island of Celebes is found. These enterprizing mariners are Mahomedans like the Malays, and are said to have established themselves here and at *Lingie,* on the Malacca frontier, towards the commencement of the last century. Along the coasts and adjacent islets is thinly scattered a race of *Icthyopophagi,* possibly identical with those described by Herodotus, termed by the Malays *Akkye* or "*Rayet Lant,*" subjects of the sea; and among the forests and mountains of the interior are found several barbarous tribes, the aborigines of the country, who subsist chiefly by hunting, and by

shooting game with poisoned arrows. Of these the natives enumerate several, viz. the *Semangs*, *Sakkye* or *Orang Bukit*, men of the hills; the *Udai Jacoons*, or *Rayet Utan*, denizens of the woods; and the *Halas*. The *Semang* and *Sakkye* are met with in *Quedah* and *Perak*, the *Jacoons* are found scattered over the rest of the interior. If credit be allowed to native information, the *Halas* are a tattooed race, dwelling in the fastnesses of *Perak*. The *Semang* and *Udai* are said to resemble the *Papuan* in colour, features and hair, but, I must say, in all the tribes of these aborigines that have fallen under my notice, I have never met with the peculiar features that stamp the negro of *Papuà*. The *Jacoons* do not differ materially from the Malay in colour or physiognomy, but struck me as being slightly lower in stature.* Many well informed natives corroborate my belief that most of the present race of Malays, that at this day inhabit the peninsula, are the descendants of Jacoon females, and the early colonists from Sumatra, with a subsequent sprinkling of Arab blood. The different tribes are sometimes generalized under the term of *Orang Benna*, men of the soil. None of them possess any written records; nor am I aware that they know the use of letters, with the exception of the *Semangs* of *Perak*, who, the natives assure me, write on the leaves of the *stebbal*. Some of a tribe from Salangore, who visited me at the mouth of the *Lingie* river, sang rude songs, and had along with their usual paraphernalia of blow-pipes, or *Sumpitans*, and poisoned arrows, a rude species of flute constructed of the *Appa bambu*. Their songs run in measured *slocas*, and, though wild, are characterized by a pleasing and artless melody. The tribes frequenting *Rumbowe* and the Malacca frontier are somewhat more civilized, many of them have been converted to Islam and blended with the Malays; from whom, when similarly dressed, they are scarcely distinguishable. The language of the various tribes slightly differs; but the whole, that I have had an opportunity of examining, bears an affinity to the purely Malayan. The Malays are supposed to be of the Tartar stock, both their features and those of the aborigines in the native states around Malacca are decidedly characterized by the Mongol stamp. To the philologist may I suggest a comparative examination of the language of the older Tartar hordes and the dialects of these nomadic tribes? The Malay language is well known to be a mixture of Pracrit or Sanscrit, Arabic, and a language, which I partly coincide with Mr. Crawfurd in calling Poly-

* See *Note on the Jacoons* at the end of this paper.—*Editor.*

nesian, a little Persian, and a dialect purely Malayan which, constitutes a little more than one-fourth of the language written and spoken at the present day. Some of the Malays believe in the existence of two tribes called *Maira* and *Biliang* ; the former of which is represented to have an arm of iron serving as a chopper, and the latter to be entirely covered with long hair. Both are represented to be highly malignant in disposition and devourers of men. These stories are derided by Malays of information ; they are not however confined to the peninsula. Mr. Marsden (Hist. of Sumatra page 41) describes two races of wild people inhabiting the interior of Sumatra called the *Orang Kubu* and *Orang Gugu*, of similar appearance and propensities.

The four interior states of *Rumbowe, Sungie ujong, Johole* and *Srimenanti*, as also the province of *Naning*, are peopled by the Malay descendants of a colony direct from the ancient empire of *Menangcabowe* in Sumatra. For further information regarding the origin, manners and customs of the Malays of the peninsula, and the singular law of inheritance prevailing among the *Menangcabowe* colonists, the reader is referred to my accounts of *Naning, Rumbowe,* Malacca and *Sungie ujong*, published in the Journal of the Asiatic Society of Bengal.

There are a few *Battaks* and *Caffirs* on the peninsula. The former, are chiefly slaves, or slave debtors, imported from the opposite shores of Sumatra ; and the latter, slaves brought over by Malay *Hajis* or Arab *Nakhodas* from Arabia, and the eastern coast of Africa. The Chinese, Chùliahs, and Klings are settlers from China, and Peninsular India, chiefly from the Coromandel coast. They form a most useful and industrious class of the community ; particularly the first, who are, comparatively speaking, most excellent artisans, agriculturists, and miners. I may take an opportunity hereafter of more minutely adverting to the habits and customs of these busy colonists from the celestial empire, and their singular system of emigration among the Indo Chinese nations, and insular states of the Indian Archipelago.

Articles of Export and Import.—The principal articles of export and produce are tin from *Perak, Salangore, Singie, Malacca, Tringaun,* and *Kemàman*, gold-dust from *Pahang, Gominchi,* Mount Ophir, *Kemàman,* and *Tringaun ;* spices, elephant's teeth, pepper, sago, sugar-canes, timber for ship and house-building, dammer, ebony, bees' wax, betel-nut, aguilla and sapan woods, hogs, poultry, buffalos, tiles, and an immense variety of fruits. The chief imports are, opium, salt, cotton cloths, tobacco and rice.

The following is a rough estimate of the average annual produce of tin from the Malayan peninsula and Junk Ceylon, obtained from natives under every possible check.

Mines.	*Produce in piculs* (1 picul=133⅓-lbs. avoir.)
Sungie ujong	7,000
Perak	7,500
Quedah	600
Junk Ceylon	1,500
Pungah	1,500
Salangore, including Calang and Langkat	2,000
Lukut (in Salangore)	1,600
States in the interior of Malacca	900
Pahang	1,000
Kemaman and Tringaun	7,000
Kalantan	3,000
Patani	1,000
Total in piculs	34,600

The tin of the peninsula and the Eastern Islands (particularly those of Junk Ceylon, Lingga and Banca, which may be styled the Eastern Cassiterides) is diffused over a great geographical extent. Mr. Crawfurd justly observes that tin wherever found, has a limited geographical distribution; but where it does exist it is always in great abundance. The tin of the Indian Islands has, however, a much wider range of distribution than that of any other country, being found in considerable quantity from 98° to 107° of east longitude, and from 8° to 3° of south latitude. Mr. Anderson since states that tin has been discovered in considerable quantities much farther north, viz., in the interior of Tavoy, in latitude 12° 40' north; the mines are situated at a place called Sakána, about four days journey from the city of Tavoy. It is said that it exists as high as 14° north in Siam.

The period of discovery of this metal in the peninsula cannot be traced, but it is assuredly of ancient date. Part of *Perak* is said to be the *Temàla*, or land of tin, of Ptolemy. *Tema* is the common Malay term for the metal. *Calang*, another place noted for its mines, is supposed to be the *Malaion Colon* of the same author, and the *Malaya Calam* of the Hindus. *Calang* is likewise a Malay word for tin. That of Banca was only recently discovered, as Mr. Marsden informs us, in 1710, by the burning of a house. The ore of the Malay Peninsula is extremely pure, being that, which, from its alluvial origin, is called stream

ore. I am not aware that it has ever been obtained directly from its matrix, the granite, in which it is supposed either to exist disseminated or in the form of veins or lodes. The ore of *Sungie ujong*, *Naning* and *Perak*, is said by Malays to be the purest, yielding upwards of 76 per cent. In 1835, Mr. J. Prinsep, Secretary Asiatic Society of Calcutta, obligingly tested for me the purity of several cast blocks of tin (prepared for sale), produce of the principal mines of the peninsula, by the specific gravity, which was as follows: pure tin at the same temperature, 84° 5′, being about 7.290.

No. 1	from Naning	7.317
No. 2	,, Srimenánti	7.262
No. 3	,, Jompóle	7.287
No. 4	,, Sungie újong	7.223
No. 5	,, Lúkut in Salangore	7.349
No. 6	,, Rumbowe	7.256
No. 7	,, Jellabú	7.314
No. 8	,, Pérak	7.299

Two specimens of the ore from *Lukut* and *Srimenanti* were also tested. The former is a fine grained black oxide of tin. Specific gravity 6.74 and yielded a produce of 70 per cent. of very good metal, on simple fusion with black flux. That from *Srimenanti* is in much larger grains or lumps. It weighed only 6.64, and yielded only 52½ (?) per cent. of metal, giving off some sulphur in the fire. It is therefore inferior to the former, but probably not to the extent stated in the above single reduction. The stream ore of Cornwall, with all the advantages of European science and ingenuity employed in its reduction, does not yield more on an average than 75 per cent. That of Banca is said to give only from 55 to 60. That of Junk Ceylon 64½.

There is considerable variation in the value of the metal produced, arising from some difference in the ore; or, what is more probable, from adulteration, or from difference in the mode of smelting. The tin from Chinese furnaces is preferred to that smelted by Malays. The tin of Banca, for instance, fetches from 16 to 16½ dollars the picul, while that of the peninsula, principally worked by Malays, sells from 14 to 15. The tin of *Perak* ranks the lowest. In consequence of a supposed adulteration in Peninsular or Straits tin, some specimens of ingots of this metal, rejected at Canton, were sent from Singapore to be assayed at Calcutta in 1831. This was done at the Calcutta Assay Office, where, after examination, the metal was pronounced to be of good quality and perfectly good in a mercantile sense. The ingots of tin

are sometimes adulterated with lead, a cheaper and heavier metal, the presence of which may be detected by ascertaining the difference of the specific gravity, that of pure tin being, at 84° Fahrenheit, about 7°29, and of lead 11.35; or it may be found approximatively by casting two bullets or ingots, one of the suspected metal, the other of pure tin, and weighing both separately; the greater weight of the former will serve to show the extent of adulteration —care must be taken that the two ingots are exactly the same size. Another mode of adulterating tin is resorted to, which it is right to put the merchant on his guard against, viz. of filling a cavity in the middle of the ingot with dross, lead, or Malay pice. The shell of the ingot is of pure tin, consequently the fraud cannot be detected by examining a piece merely cut off. A case of this sort was recently discovered at Singapore. The fumes of sulphur are resorted to in order to give the tin the colour of that of Banca.

"Great Britain," says Dr. Lardner (Cabinet Cyclopædia, No. 54), "notwithstanding the productiveness of her own mines, imports upwards of 700 tons per annum, of Oriental, or, as it is more commonly called, Banca tin, from the name of one of the islands where it is chiefly obtained. The Malay countries are reckoned the richest depositories of this metal in the world; and from them, China, Hindustan, and many European markets are chiefly supplied." The total produce of the tin of the peninsula is a little more than half that of England, which is estimated at from 3 to 4,000 tons annually. She exports annually about 2,000 tons, including 400 or 500 tons of that received from the Straits and Banca. It appears from tables in McCulloch's Dictionary of Commerce, that Malay tin is now very extensively employed for warehousing into England; at the same time that large quantities, probably from Banca, are carried direct into Holland, where this has affected the export of British tin to a considerable degree.

Gold.—With regard to the produce of gold, it may be remarked that the peninsula of the present day, although auriferous, does not merit the appellation of "Kruse" or "Golden Chersonesus," so much as its neighbour, the island of Sumatra, to which, as previously observed, there is a tradition, mentioned by one of the early Portuguese historians, that it was formerly united. Sumatra, by some, has been supposed to be the *Taprobâna* of the ancient geographers; this, Mr. Marsden, with his usual acumen, denies, ascribing rather the name to Ceylon, the *Serendib* of Mahomedan writers, and the *Lanca* of the Hindus;

and affirms that Sumatra was unknown to them, denouncing the descriptions given by Strabo, Pomponius Mela, Pliny and Ptolemy, as obscure and contradictory. Admitting the tradition of the Malay peninsula and Sumatra having once formed one large undivided tract, to be based on truth, it might both account for the circumstance of so extensive an island as Sumatra, and one so rich in gold and spices, having, as seems to be the case, escaped the notice of ancient geographers, and strengthen the opinion which has applied the term of "Aurea Chersonesus" to this part of the continent of Asia. How far geological observations will corroborate this supposition remains to be shewn. The quantity of gold dust exported annually from the south-west coast of Sumatra and Achin alone, according to Marsden and Hamilton, amounts to 26,400 oz. The former states, that there are no fewer than twelve hundred gold mines in the dominions of *Menangcabowe* (in the interior of Sumatra) alone, a considerable portion of the produce of which (perhaps one half) never comes into the hands of Europeans.

The annual produce of gold of the Malay peninsula, on a rough estimate, amounts to 19,800 oz. It is chiefly got at *Ulu Pahang*, *Pringaun*, *Kalantan*, *Johole*, *Gominchi* and *Jellye*, at *Reccan*, and *Battang Moring*, and other places at the foot of Mount Ophir. It occurs disseminated, and in thin granular veins, in quartz; and in alluvial deposits, such as beds of streams. It has been found near beds of tin ore.

Iron.—A small quantity of iron is found in the interior of Quedah. Siam and Billiton produce this metal in abundance.

I do not find that silver is produced in any part of the peninsula, although *Perak* from its name, which in Malay signifies silver, and which is conjectured by Marsden to have been the Αργυρα of Ptolemy, might have been supposed to have derived its appellation from the presence of this metal; for which probably the tin was in those days at first mistaken.

Zoology.

Mammalia :—Quadrumana.—In this cursory sketch of the zoology of the peninsula, a few only of the most remarkable animals will be mentioned. Commencing with the *Mammalia*, the order *Quadrumana* ranks first. It has been stated that the *Orang Utan* is found on the peninsula, but I much question, whether this has been ascertained by naturalists. It is probable that the *Pongo Wurmbii*,

has been mistaken for it.* Of the genus *Hylobates* are the *Siamang, Simia Syndactyla* of Raffles; the black *Unka, Simia Lar* of Vigors; the white *Unka, Hylobates agilis* of F. Cuvier; the Chimpanse or *Simia Troglodytes* of Linnæus. Of the genus *Semnopithecus,* are the *Ching-kon, Simia cristata* of Raffles; the *Lotong, Semnopithecus Maurus* of F. Cuvier, the *Kra,* or *Simia Fascicularis;* and of the genus *Macacus* the *Broh,* or *Simia Carpolegus.* Of the genus *Loris* are two species, the *Kukang* or *Lemur tardigradus,* and the *Nycticebus Javanicus,* the latter of which however I have not seen. The former of these animals is termed by the Malays *Kamálasan* from its supposed bashfulness in hiding its face, or rather screening its eyes from light, its habits being nocturnal.

Cheiroptera.—Among the *Cheiropterous* or bat family are the Vampire bat, the *Vespertilio Vampyrus,* the *kulowang* of the Malays. The *Pteropus edulis,* or eatable bat, is said to be found in the islands.

Plantigrada.—Of the *Plantigrada* tribe are the Malayan bear, *Ursus Malayanus,* called *Bruang* by Malays: discovered by Sir Stamford Raffles in Sumatra, and first described by him in a paper read before the Linnæan Society in 1820. A specimen was sent by him to the museum at the India House. The hams of this animal are held in great estimation by the Chinese. There is another species existing in the interior of Malacca, called the *Bruang anging,* or bear dog, by the Malays.

Digitigrada.—Of the *Digitigrada* there are the *Lutra Leptonyx,* or "dog of the water," *Auging Ayer* or otter of the Malays, and several of the genus *Viverra,* viz. the *Musang,* the *Musang Jebbat* or civet cat, and the *Musang Akkar* or climbing *Musang.* Of the genus *Felis,* we have the royal tiger, the tiger cat, the spotted black tiger, *Rimon Arang* of the Malays, a singularly untameable beast; the *Rimon Dahan* or *Felis Macroscelis* of Horsfield, that lives among the boughs of trees; and the Java cat, *Felis Javanensis.* Besides these are the *Rimon Kumbang* and *Salat,* said to be species of leopard by Marsden, the *Rimon Balu* or *Felis Sumatrana,* and the *Rimon Jumpak* and *Akkar.* There is said to be a sort of wild dog in *Naning,* called by Malays, *Anjing-utan,* or dog of the woods.

* Cuvier, and his English commentators, express an opinion that the Pongo is the adult Orang Utan—G. St. Hilaire thought differently—Mr. Swainson (*Nat. Hist. and Clas. of Quadrupeds*) has succeeded, it appears to us, in establishing it as a distinct species of *simia,* reserving for it exclusively Geoffroy's appellation *Pithecus.* Mr. Swainson thus characterises it:—"Facial angle—? Cheek pouches and tail none; arms long; muzzle lengthened, similar to the baboons; canine teeth very large. Habitat, India (Indian Islands?) Species 1."—Editor.

INSECTIVORA.—Of the tribe *Insectivora*, is the *Gymnura Rafflesii*, an animal of which I have not seen a specimen, called by the Malays, *Tikus-am-bang-búlan*. Sir S. Raffles discovered it in Sumatra; the native name was given to an animal brought to Colonel Farquhar, from the interior of Malacca, previous to its discovery by Sir S. R. in Sumatra, which Sir Stamford believed identical with it. There are several varieties of the genera *Tupaia*, and *Sciurus* or squirrel family.

EDENTATA.—Of the tribe *Edentata*, are the hairy and scaly *Pangolins*, the *Penggoling-rambut* and *Penggoling-sisik*, or the short tailed manis (*M. Pentadactyla* of Linnæus), called *Penggolings* from the faculty they possess of rolling themselves up.

PACHYDERMATA.—Of the thick skinned family, *Pachydermata*, is the elephant, *Elephas maximus*, in great abundance; the *Badak*, or Sumatra rhinoceros; the Malayan tapir, the *Mariba* of F. Cuvier, rare; and the wild hog. Specimens of the Malayan tapir have been sent to Europe by Duvancel and Sir S. Raffles; a female upwards of four feet in height, has lately been presented by Lieutenant Mackenzie to the Asiatic Society of Bengal. The remark of our Secretary Mr. Cole, on a drawing of the animal just mentioned (Journal No. 16, p. 146), that "the figure in the English edition of Cuvier, represents a comparatively light and agile animal, quite devoid of the heavy look, cumbrous figure, and rugous skin, delineated in the drawing", perfectly coincides with my observations on living specimens of the Malayan tapir. Drawings of the animal should always specify the age or approximative age; as both the colour and texture of its coat I have seen to vary as the animal grows up. The *Seladang* is supposed by some zoologists to be identical with the tapir. The Malays however make a difference, distinguishing the true tapir by the name of *Tennok*. This is a point desirable to ascertain. The *Seladang* may probably be a variety.

RUMINANTIA.—In the genus *Moschus* we have those elegant deer in miniature, the *Plandok* (*moschus pygmeus*) the Chevrotin of Buffon; the *Nàpu*, or *Moschus Javanicus*, of Pallas; and the *Kanchil*, or *Moschus Kanchil* of Raffles. The Malays dry and preserve the flesh of these animals, which tastes a little like that of the hare. They pine away in confinement. I attempted in vain to send a living specimen of each to England. The *Plandok* is a favourite animal among

the Malays, and frequently alluded to both in their prose compositions and poems. Of the *genus*, *Cervus*, are the *Kijang*, or *Cervus Muntjac*, the *Rusa*, or *Cervus Hippelaphus*, and the *Cambing-utan*, goat of the woods, or *Antelope Sumatrensis.* The *Cervus axis*, or spotted deer, has been imported at Pinang from Bengal. It is indigenous in Sumatra. The *Bos Arnee* or buffalo exists in a domestic state on that part of the peninsula occupied by Malays. It occurs I believe wild in Burmah, and at the southern base of the Himalayas. There are two kinds of bison found in the forest* though rare. Neither the horse, ass, camel, cow, hare, rabbit or fox, are, I believe, indigenous in the peninsula; nor the *singh* or lion, although *Singhapúra*, or Singapore, is stated in the Malay annals to have been so called from the appearance there of an animal of that species. Among the *Hystricidæ* is the *Landok*, or *Hystrix longicauda*, the Malay porcupine. Those that have fallen under my observation, appear to be larger than the Indian porcupine.

Cetacea.—The last order of *Mammalia* is that of *Cetacea*, connecting as it were the inhabitants of the land with those of the watery deep. Of the genus *Halicore*, stands first the supposed Mermaid of the eastern seas, the *Dúyong*, improperly termed *Dugong*. Skeletons of this singular production of nature have been sent to Europe by Mr. Crawfurd, Sir S. Raffles, and Messrs. Diard and Duvancel. In 1830, a *Duyong* preserved in spirits was forwarded by Mr. G. Swinton, to the Royal Society of Edinburgh, and delivered over to Dr. Knox for dissection.† But it had been unfortunately divided into three portions which incalculably diminished its value. It is to be hoped that this deficiency will be shortly supplied through the zeal of some of our countrymen in the Straits.

* The horns of a bison found in the Naning district are now in the possession of Brigadier General Wilson, c. b.

† The following description of the *Duyong* is from the Ed. Cab. Library, No. viii. p. 76.

"The Halicore, or daughter of the sea is called *duyong* by the Malays, and has hence acquired the name of dugong in our books of natural history. There is only a single species as yet ascertained. It inhabits the Indian seas, especially the Sumatran coasts, and has been confounded by several voyagers with the lamantins, which belong to the African and American shores. It measures seven or eight feet long, and is covered by a thick hide, of a pale-blue colour, with whitish marks on the abdomen. The head somewhat resembles that of a young elephant deprived of its proboscis. The body is fish-shaped; the anterior extremities are contained within an undivided membrane, in the form of a fin. The rudiments of a pelvis are observable and the caudal extremity is horizontally sloped, or cut like the arch of a circle. The flesh of this animal is held in great estimation, and is usually reserved for the tables of the sultan and rajas. Its own food is said to consist of *algæ*, *fuci*, and other marine productions of the vegetable kind."

Aves.—Among birds the Falcon tribe is classed first by naturalists. Birds of this kind are generally known to the Malays under the name of *Lang*: there is the *Aquila Pondiceriana*, and the *Lang laut* or sea falcon. The *Falco dimidiatus* of Raffles; besides many others too numerous to mention. Of the *Strigidœ* or owl family, called by Malays *Buring Hantu*, the spectre birds, the woodpeckers, and the *Lanii* or butcher birds (of this last *genus* is the *Bárubàru*, an elegant singing bird), are several varieties; and four or five of the *Buceros*, or rhinoceros horn-bills. One or two of storks, among which is the *Bangu* or *Ciconia Javanica*. Of parrots, kingfishers, flycatchers, pigeons and doves there is an endless variety. The *Hirundo esculenta*, or swallow that builds the edible birds' nest, frequents the islands. The yellow-caruncled, black mina, or *Gracula religiosa* of Linnæus, enlivens the forests. Those superb creatures the crimson-plumaged *Pergam*, the Argus pheasant, the *Phasianus Nycthemerus* or pencilled pheasant, the peacock pheasant, the common peacock, the blue pheasant partridge, the jungle fowl, and humming birds, dazzle the eye by the beautiful brilliance of their plumage. The murei or dial bird, the *Gracula Sanlaris* of Linnæus, is a native of the peninsula.

Snipes, common and painted; wild duck; teal; the common, grey, and whistling plover; rails; bitterns; red, black and green quail' abound in the plains, marshes, and banks of rivers. The red-legged partridge is said to exist, though I never met with it. The common sparrow and crow are to be found as they are in every quarter of the globe. The latter, however, is not plentiful.

Reptilia.—Of the class reptiles, order *Testudinata*, are the river, sea and the hawksbill turtle. Of *Loricata*, the crocodile is said to exist. Of the order *Sauria* are many varieties, among which is the common alligator in great abundance, the elegant monetor lizard, and, in the genus *Draco*, the flying dragon of Linnæus. Among ophidians is the *Boa Phrygia*, the Python of Cuvier. Of the *Coluber* genus are the tiger snake, so called from its stripes; the whip snake, and many others. I once shot a variety of the *Cobra di Capello*, perfectly black, except the belly which was of a darksilvery hue. There are also some interesting varieties of the genera *Leptophis, Hurria, Cophias*, and of the *Hydrus*, or water snake.

Pisces.—Among the fishes we have the sword-fish, the electrical skate, the ray, the fasciated ray, the shark, the zebra shark, the ham-

mer-headed shark, (*Zygæna vulgaris*), which may be seen almost daily in the fish bazars, the *Chætodon Rostratum,* that kills its prey by the accurate and forcible propulsion of a drop of water from its tubular mouth; two other varieties, and the *Chelmon.* The *Jkan Layer* is a fish about eight or ten feet long, that erects its dorsal fin like a sail above the water; whole shoals may be seen passing up and down the Straits, like a small fleet of sailing boats. Excellent fish for the table abound, among which are the black and white pomfret, the Indian sole, and seer fish.

Of the *Exuviæ* of *Testacea,* or shell-fish, there is not so great a variety thrown on the coasts of the peninsula as one would expect. Among the *Cephalopodous molluscs* is the *Sepia tuberculata* or cuttle-fish. Several of the *Nautili, Murices, Turbinellæ,* and many others. Among the bivalves are various *Pectens, Spondyli* and *Mallei*; the *Monoculos Cyclops* which is eaten by the natives; oysters, cockles, and muscles.

Crabs are found both of the land and sea kinds, also great quantities of shrimps, of which and a small kind of fish, the *Caviar* of the East the odoriferous *Blachang* is composed.

There are a vast number of insects chiefly of the orders *Coleoptera*, *Lepidoptera* and *Orthoptera.* The depths of the forest resound with the whirrings and wheellings of families of the *Grylli*, *Cicadæ*, and *Scarabæi*; and by night its dark recesses are often illuminated by the liquid brilliance of the glittering firefly.

Vegetable Kingdom.

This comprises an immense variety of trees and plants, many of which are still unknown and present great scope to the botanist. French naturalists have occasionally penetrated the forests, but for most of what is known of the botany of the peninsula, we are indebted to the labours of Wallich, Jack and Ward, to whose publications I must refer the reader, contenting myself with mentioning a few of the most general interest. The trees most in use for purposes of house and shipbuilding are the *Chingei,* the *Dammer Laut,* the red and white *Meranti* for planks, the *Bintangor (Calophyllum inophyllum,)* used for the masts and spars of vessels; the *Murbowe, Metrosideros Amboinensis,* a large fine tree of hardish wood; the *Kranji* used for posts and masts, the *Rungas, Anacardium encardium,* for furniture, the *Medang Ketanaahan* and other *Medang* trees. The *Kayu Kamuning* is a beautifully veined hard wood, taking a high polish, and used principally for the handles of Malay knives and daggers. Ebony, Sapan, Lakkar and

Aquila woods also form articles of commerce.

The fruit trees of the Straits are too well known to require a particular description here. The *Durian*, *Mangostin*, *Duku*, *Tamarind*, *Langseh*, the *Rambye*, *Rambutan*, the cashew or *Caju*, the *Jambu Ayer* and *Jambu Kling*, the custard apple, *Papaya*, the *Nam Nam*, a fruit with a fine flavour acid not unlike that of an apple, the plaintain, pine apple, cocoanut, lime, guava, mango, *Pulassan*, *Tampui*, jack, *Tampuni*, and a long list of others.

While the forests abound with bambus, canes, rattans, parasitical plants, timber and fruit trees, the shores and marshy banks of the rivers are fringed with the mangrove, the *Api-api*, or *Pyrrhanthus littoreus*, *Nibang* and *Nipah* trees. The two last are *palmæ* and of great utility to the natives—of the tough elastic stem of the former, the *Areca tigillaria* of Jack, bows and spears are constructed, also the posts and laths, which almost universally constitute the *lantei* or flooring of Malay houses. The little buckets in common use in the Straits, called *Timba*, for carrying water, are made from the leaf like sheath that covers the fruit. Of the leaves of the latter, the *Nipa fruticans*, the thatch is made, called *attap*. From this tree a sort of sweet toddy is got. Among the *palmæ* are also the graceful *areca* or betel-nut palm; the true sago palm, the *Metroxylon sagu* or the *Rumbiya* of the Malays, and the *Borassus Gomutus* or *Anou* palm, from which is produced but little farina, and that of an inferior description. The Malays obtain from the *anou* fruit excellent *nira* or toddy, and a sort of coarse sugar, also the hard black spikes used by them for caltrops and pens for writing, which are found enveloped in a black fibrous substance, resembling in texture coir, but stronger. This is used for the thatch of the mosques and better sort of houses in the interior, and for cordage. The teak tree it is asserted by Mr. Crawfurd is not indigenous in the peninsula; but the Malays of the interior affirm that it is sometimes found wild under the name of *Játi*. The *Upas* tree of the Javans or the *Ipoh* of the Malays is found, though rarely in the forests. It is described to be a largish tree with an ash white bark. The aborigines extract a poison also called *ipoh* from a parasitical plant.

The Catechu shrub, *Nauclea Gambir*, is produced on the rising grounds. The India rubber plant or *Urceola elastica* is found encircling the trees at Pinang. The *Rámi Rámi*, or *Urtica tenacissima*, of Roxburgh, of the fibres of which the Malays twist fishing lines, cordage, &c. flourishes on the peninsula. The Chinese affirm that the *Rámi Rámi* is the identical plant used in China for the manufacture of the famed "grass cloth." The cocoanut of the Straits, I am informed, contains a silicious concre-

tion somewhat resembling that of the *tabashir* found in the joints of the bambu. Perhaps some of my readers now in the Straits will ascertain whether this be the fact; and if so, forward specimens of this singular substance to the Society. On the higher zones of the hills are found rhododendrons, the cypress, fir, and a variety of beautiful ferns. Some specimens, which I brought from the summit of Mount Ophir in 1833, were examined by Dr. Wallich, who furnished the following note upon them (Jour. As. Soc. for Jan. 1834, p. 48).

"The specimens from Mount Ophir, with which I was favoured the day before yesterday, consist of two ferns, three *Lycopodineæ*, and two *Phænogomous* plants. They are not in a good state of preservation, and only one has any fructification, but they are nevertheless very valuable, and I feel greatly obliged to Lieut. Newbold for them. The most interesting among them is a specimen full of good sori of *Matonia pectinata*, Brown, published in 1830, in *Plantæ Asiaticæ Rariores*, vol. I. p. 16, table 16, from a specimen, unique in Europe, which was gathered in the identical locality by Col. Farquhar. The individual now before me beautifully confirms the generic character and general observations relative to this remarkable fern, which were politely supplied for the above work by Mr. Brown; in shape it differs in having a bifid frond, the pinnæ being unilateral towards the bifurcation. The other fern may perhaps be a *Blechnum*. The *Lycopoeineæ* are very curious, and belong seemingly to new species. Of the Phænogamous plants, one is exceedingly remarkable. It has the habit of some members of the coniferous, as well as the myriceous, tribe; the structure of the wood obviously brings it under the former; the leaves are acerose, opposite, and gland-dotted. Perhaps it is a *Dacrydium*. The other plant belongs perhaps to the family of *Ericeæ*."

Of spices, the wild nutmeg is indigenous. The true nutmeg, cinnamon and cloves have been long introduced and thrive well. The tobacco plant, cotton, coffee, sugar-cane, the pepper-vine and the true indigo plant, *Indigo fera tinctoria* are cultivated with much success. The *Marsdenia tinctoria*, the *Tarum Akkar* of Malays, a climbing species of indigo, grows wild. Native catalogues of Malayan flowers, plants, shrubs, grasses, fruit and forest trees, will be shortly forwarded to the Society, together with native lists of quadrupeds, birds, reptiles, fishes and shells.*

Of our political relations with the states of the Malayan Peninsula, their extent and boundaries, I have already given an outline in the Journal of the Asiatic Society of Bengal, vol. 5, p. 626.

* Published in the APPENDIX to this Number.—*Editor.*

Note on the Jacoons.

[A late lamented clergyman of the Church of England on the Madras Establishment, furnished me with the following extract from his note-book, containing interesting mention of the Jacoons, spoken of in the text at p. 63.—Editor.]

" Late in 1835, I took a ramble to the southern *Ayer Panas** and Reihm. The well at *Ayer Panas* is not quite hot enough to fix an egg; I used it as a bath, letting the water cool in vessels before throwing it over me, and at last could just jump into the well and out again, it being only knee deep. The heat may be about 130°; it is impregnated with sulphur, but I think not with iron. A good government bungalow in the middle of cleared ground of a few hundred yards—the rest dense forest. The foot marks and other signs of elephants, tigers and deer, were frequent, and at night in bed I heard the wild hog, with their squeaking young ones, and the sough or heavy sigh of the tiger from the deep forest; which I felt to be the most dismal sound that ever met my ear—the loud roar is nothing to it. The natives say it is generally towards morning when he approaches his den, after prowling all night, that the tiger emits this *singultus*, by which he seems as if relieving his great lungs. There is a melancholy in it, which impressed me with a sense of desolation. The last night of my stay we were roused by a cry resembling that of a pig in the hands of a butcher —it was a wild hog seized by a tiger, they said. Every one was up, shouting and making as much noise as possible to scare the freebooter; but of course nobody stirred out; and I fancy no Malay would have left his hut at such a time, had the tiger's prey been his own father. Although the Malays so dread the tiger when they actually hear him or his doings, yet they are reckless enough, when they do not positively know him to be near, and they traverse the forest in quest of fruit or to cut timber in the day time. They pointed out to me one place which they superstitiously avoided; several people, they told me, had gone in that quarter to cut wood, but never returned, having been seized by spirits (*datoo*). No doubt they had been carried off by wild beasts.

The forest supplied abundance of fruit, indeed the people cultivate scarcely any thing—a little paddy, but not enough for their own consumption—their supplies of rice, tobacco, cloth, &c. they get from Malacca in exchange for fruit; although with little labor they might fur-

* Malay, hot-water.

nish themselves at home, and ought to have a surplus for the Malacca market. All are lazy, but the women do more work than the men. They have plentyof buffaloes, animals which in such a country require no care, except to pen them at nights—and yet I could not get a drop of milk—I believe they never milk them. I brought away specimens of different forest woods; as the cassia, the lemon, the mangusteen, the nutmeg, of which last the nut is larger, but less aromatic, than that of the cultivated tree. A forest road for five or six miles brought me to Reihm, where is a stockade with a few sepoys. Here, after much difficulty, I succeeded in having five of the Jacoons (supposed aborigines) brought in from the jungle. These poor creatures have no houses—neither plant nor sow—nor, I believe, make use of fire for any purpose—but lodge at night in trees; and in the day eat wild plaintains or any other fruit they meet with. If, in intercourse with the Malays, they obtain a little rice, they devour it raw, unless given to them boiled. They are generally quite naked, but sometimes the women wear the reddish bark of a tree, beaten into something of a pliable texture. I brought one of these away. Of their language, or rather chatter, I had not time to get any vocabulary. Dr. Bennet and others assert, that these Jacoons cannot be derived from the same origin with the rest of mankind, but are an inferior species—no grounds whatever for such an assumption. Of those I saw, the two elderly people were certainly frightful specimens of humanity—the woman particularly--but why? because of their wretched manner of life, starvation, and exposure. The two infants were fine little things as need be, and the other, a lad of perhaps thirteen, was comely enough—but I can well conceive that, soon after that age, they begin to wither for lack of nourishment and needful care. I gave them two dollars, and when the Malays made them understand the value of the coin, the man asked in simplicity whether I designed the sum to be shared amongst the sepoys and all others present, or if it was exclusively for themselves.

I asked the Jacoons some questions to find out what their idea of God was; as soon as they understood the tendency of my questions, the old man, who spoke Malay, exclaimed "Oh that is *Islam.*" (Mahommedan being the only religion they could have any conception of). "We are forest people (*Ourang Outan*); we know nothing of that."

F. J. D.

III.—*Note on Malayan MSS. and Books presented to the Society.*—*By Lieutenant* Newbold.

No. 1.—Is a copy of the celebrated Malay historical work the *Sila-sila* or *Silsilah-us-Salátin,* the *Sejára Maláyu,* by *Tun Mambang Bandahára,* composed by order of *sultan Abdullah,* son of *Abdul Jalil Shah,* in 1021 of the Hejira. This work has been translated into English by Leyden, with an introduction by Sir Stamford Raffles. The MS. presented was transcribed from an old and highly valued copy at Malacca. From the fabulous origin of the Malays from Alexander, the lord of the two horns, it is continued down to the taking of Malacca by the Portuguese in 1511, and the consequent foundation of the empire of Johore. It contains not only the history of the Malacca kings, but also notices of the states of *Menangcabowe, Palembang, Siac, Jambi, Achin,* &c. in Sumatra, and of those of *Pahang, Patani, Tringaun, Kalantan, Quedah, Perak,* &c. on the peninsula.

No. 2.—Is the *Addat Achi,* or code of Achin. It is divided into four parts. The first entitled "*Parentah Segála Rája Rája,*" rules of government for kings—the second "*Silsilah Rája Rája di Bander Achi*"—and the third, "*Adat Mejlis Rája Rája,*" etiquette to be observed at court. The fourth and last embraces a variety of regulations for Port duties and customs, with rules to be observed by the minor officers of government. Of the genealogical part which comprises the reigns of the Mahomedan kings of Achin from the 601st year of the Hejira down to the present time, I have already furnished an abstract, together with a notice of the work itself.*

No. 3.—Is divided into seven portions. The first consists of historical fragments relating to the march of Alexander the Great towards the sun —i. e. to the east. His battle with *Raja Kidi Hindi* whom he defeats and converts to the religion of *Ibrahim* (Abraham). The origin of the kings of Malacca from the Rajas of the hill of *Sagàntang*—their descent to *Palembang*—to *Bantan*—to *Singhapùra,* and thence to Malacca. The origin of the *Pagarùyong* chiefs from the Rajas of *Sagàntang,* who founded the Malay empire of *Menangcabowe.* The marriage of sultan *Mahomed Shah* of Malacca—court etiquette, &c.

* Journal No. 10, pp. 54 to 57.

It contains also an account of the famous champions of Malacca—the nine *Hongs.* The flight of *Mahmúd Shah,* on Malacca being stormed by the Portuguese; first to *Muàr,* thence to *Pahang, Bintan,* and finally to *Johore,* where he founds a kingdom. His unsuccessful attempt on Malacca and the subsequent fall of that city—the expulsion of the Portuguese by the united forces of the Dutch and king of *Johore,* and division of the lands and spoils of Malacca between the two victorious powers.

To this succeeds an account of the origin of the interior state of *Rumbówe*—the ancient boundaries of *Naning*—the origin of the principalities of *Quedah, Patáni,* and *Pahang,* and some interesting particulars touching the history of *Johore.*

Part the 2d of No. 3 is a copy of the Malay land code, a notice of which has been already given.* Part 3 is the genealogy of the Rajas of Samenap, from the Javan year 1284 to 1743 of the same era. This is prefaced by stating that the religion of Budd'ha prevailed in Samenap before the introduction of Islam. It is a copy of a MS. late in the possession of the king of *Samenap, Sri Padùka Sultan Pakko Natto Ningrad,* furnished me by Count Von Ranzow. Part 4 comprises the code of Johore. Part 5 is a copy of some instructions given by the Dutch government of Malacca, to its Malay agent Abdul Kadir, who proceeded on a mission in April 1821, to the Malayan states, for the collection of Malayan MSS.; an account of which is written by *Abdul Kadir* himself. The places he visited were *Tringáun, Rio,* and *Lingga.* At *Tringáun,* the chiefs informed him that in consequence of the "*Gúru,*" *Tuan Haji Abdul Kadir* having interdicted the perusal of the histories *(hikàyet)* of kings of former times, many MSS. of this nature had been burnt, and others carried off to different countries. He, however, contrived to collect the following at *Tringánu.*

The Hong Tuah.
,, Kissa Raja Maláyu. } bound in one large volume.
,, Sri Ráma,.............in one vol. large.
,, Kobat Léla Indra,........2 vols.
,, Putra Gungga Sacti,......2 vols.
,, Chayya Langkári,........2 vols.
,, Charángga Lina,.........1 vol.
Two other MSS. names not mentioned.

* Journal No. 13, p. 390.

At Lingga.

The Peráil Hukum.
,, Pusáka Besar.
,, Hikáyet Plandok Jináka.
,, Ilon Falek.

Seventeen other MSS. were procured, of which *Abdul Kadir* does not give the names. The spirit and liberality evinced by the Dutch government in this matter are highly praiseworthy, and worthy of example.

Part 6.—Comprises the history of *Rio* and *Johore*, from the conquest of that empire by the chief of *Jambi* in 1674 A. D. to the attack of *sultan Ibrahim* of *Salangore* on *Perak*, towards the close of the 18th century. Of the conquest of *Johore* by *Jambi* nothing is mentioned beyond the date. *Abdul Jalil* the *Lacsamana* founds *Rio* on the river *Chárang* at *Bintan*, *Murhum Besar*, the then sultan of Johore, dies at Pahang about 1678. Sultan Ibrahim orders an expedition against *Jambi* and *Siac*, which is unsuccessful. Sultan Mahmud is killed at *Kota Tinghie*, 1701. Sultan Abdul Jalil Shah III. re-established the old city of *Johore*, whither he repairs after seven years residence at Rio, but is compelled to retire by the Menangcabowes, who take the place in 1719 A. D. Abdul Jalil proceeds to *Pahang*; thence to *Tringaun* and eventually to *Pahang*, where he is killed near the mouth of the river, in an attack made by LacsamanaNakhodaSikkam A.D. 1723. Sikkam takes the sultan's family to *Rio* to Raja Kechil. The next year the Bugis attack and take *Rio*, Raja Kechil making his escape to *Quedah*. The Bugis chiefs elect Raja Suliman, Abdul Jalil's son, as king, under the title of Badr Alum Shah, A. D. 1724. He goes to *Pahang* in 1737 and builds a walled monument over the remains of his father. In 1738-9, Raja Kechil, and other Malay chiefs, repeatedly attack *Rio*, but are defeated. Dyeng Camboja is elected Muda of *Rio* A. D. 1755 at Salangore, and sails for *Rio* accompanied by Raja Hadji son of the late Muda Dyeng Pali.

Sultan Suliman, with the Hollanders of Malacca, goes to assist Raja Buang of *Siac* against Raja Alum, when Dyeng Camboja quits *Rio* with his family for the *Lingie* river near Malacca, where he settles and assists the vanquished Raja Alum with two *prahus*, which he takes to *Battu Bhara*: Sultan Suliman sends to *Lingie* to demand from Dyeng Camboja the arms belonging to Johore he had carried off. Dyeng Camboji denies it: Raja Haji is sent to fetch him. Dyeng Camboja, with the Raja of Salangore and the Bugis chiefs, are attacked at *Qualli Lingie*

by an expedition from Malacca of 12 ships, with the sloops and *Penjajaps** of Eang de per Tuan Kechil, and Dyeng Túmú, altogether, great and small, about 46. The troops land at *Tanjong Sri* and the attack commences. Raja Haji runs amok, and is wounded. Putri of Mandura is killed. The assault is very severe, and at last Dyeng Camboja and the Lingie people are forced to flee into the interior to Rumbowe, with whose chiefs, Raja Alum, the Panghulu and Ampat Júkú, the former forms an alliance, in which it is sworn by the solemn oath, called the "*Sumpah-setia Berkaoha darah,*"† to go down and attack Malacca. About fifteen days after their defeat, the Bugis of *Lingie* and *Salangore* and the people of *Rumbowe* march upon Malacca, attack and burn the suburb of Tranqueira, erect two stockades at *Klay-bong,* one for the Eang de per Túan Múda, the other for the Raja of Rumbowe. *Pringgit, Bukit China* (the hill on which is situated the cemetery of the Chinese of Malacca, and crowned by a redoubt) *Samábu* and *Teloh Katápang,* to the south of the city, fall successively. Raja Syed from *Salangore* and Raja Alum from *Battu Bhara* (in Sumatra) now join the Muda's forces. The latter erects another stockade at *Klaybong.* At this crisis succours arrive for the Dutch garrison from Batavia; they make a sally on the stockades; but, says the Malay historian, "The power of the Great God assisted his slaves, and they were not worsted, nor suffered much loss. Of shoes and hats two or three loads remained on the field." A council of war is held and *Pringgit* again attacked and taken. The Hollanders now request a truce, which is granted. The war had lasted nearly nine months. The chiefs return to Rumbowe. Dyeng Camboja goes from Rumbowe to Padas, where he finds Raja Haji, now recovered from his wounds. The sultans of Johore and Salangore, and many other chiefs repair to Malacca, where they have an interview with the Dutch governor. Dyeng Camboja, the Muda, with Raja Haji, sails to *Salangore,* returns to *Padas,* and thence proceeds with the sultan of Salangore to Malacca, where he has an interview with the "Governador" outside the Tranqueira gate, and concludes a treaty between the Bugis and Dutch Company—returns to Padas, which becomes the head quarters of the Bugis after their expulsion from Rio and Lingie—Sultan *Sulıman* is reconciled to the Bugis and Malay princes, and sends the sultan of Salangore and Raja Haji for Dyeng Camboja from Padas to Rio, but shortly after dies at Rio. Dyeng Camboja takes up his residence at Rio. War at Tannah Merah in Singapore. Sultan

* A Penjajap is a sort of decked vessel. † An oath taken over a mixture of blood.

Ahmed succeeds to the throne of Johore. Raja Haji, and the Raja of Salangore, Salah uddin, attack and take Quedah after a contest of seven days. Dyeng Camboja dies at Rio. Raja Haji elected Muda in his room by Tan Abdul Majid. The sultan of Salangore dies; succeeded by his son Ibrahim. Raja Nala his brother becomes Muda of Salangore. Shortly after this, Raja Haji made the celebrated attack upon Malacca. There are several accounts of this daring assault; the following is a translation of the Malayan narration.

Raja Haji's attack upon Malacca, in concert with the sultans of Johore and Salangore, Mahmud and Ibrahim, in 1782.

"Whilst Raja Haji was Muda of Rio, a ship freighted with opium arrived from Bengal and anchored off Tanjong Pinang.* A Dutch ship from Malacca unexpectedly came and attacked her at the mouth of the *Rio* river. The Bengal vessel retreated up the stream as far as *Pulo Bain*, but the Dutch pursued, took possession and carried her off to Malacca.† Raja Haji followed with many men as far as Muar (a large river about 30 miles S. E. from Malacca) where he was visited by Senior Abrang (Abraham de Wind) and the Capitan Malayu, who had been sent from Malacca. What occurred at this interview transpired not, but Raja Haji returned to Rio.

Shortly afterwards ships‡ from Malacca appeared before *Rio* and blockaded the mouth of the river. The people of *Rio* went forth and attacked them in *Penjajaps.* This warfare continued without either side gaining much advantage. About this time the sultan and Muda of *Salangore*, with the Dattu Dattu Pengawyes, and a numerous body of men, sailed from Salangore to attack Malacca. They touched at *Lingie*, ascended the river to *Rumbowe*, and held a council with Panghulu Loyang, and the Ampat Súku at *Padas.* The Salangore fleet next sailed to *Sungie Baru* (a small river about 20 miles N. W. from Malacca) where they established a post. Thence it advanced to *Battang Tiga* (a place a little to the N. W. of Malacca). Here a large stockade was constructed, on which the men of Malacca made a sally, but were repulsed, and one of the party made prisoner.

* The European accounts state it was a French ship.

† Here, it is said, the Dutch and French divided the spoils without reference to the claims of the Malay sovereign of Rio, in whose port and by whose permission the vessel had been seized. Raja Haji irritated at such treatment declared war, after having made several fruitless demands for his share of the booty.

‡ A force under Francois Lencker, president of the Court of Justice, consisting of about 17 small vessels.

The vessels that had blockaded *Rio* now returned to Malacca. On this the Salangore chief embarked with thirty men on board a *Kakab* to invite the Muda of *Rio*, Raja Haji, to join in the siege. He found him prepared for this purpose. After a short stay, the two chiefs, accompanied by the young sultan of Johore (Mahmud), and a great number of the men of *Rio*, weighed anchor and sailed to the *Muar* river, where they landed the Sultan, and pursued their voyage towards Malacca, to *Teloh Katápang* (a small Bay a little to the S. of Malacca), where Raja Haji formed a post, and ordered Pengawa Satti to attack *Samabo Besar*, which is taken. The sultan of Salangore ordered thirty or forty of his men to take a large vessel, presented by the sultan of Johore, from *Teloh Katapang* to *Battang Tiga.* They made the attempt, and did not leave her, until a ball struck her in an attack made by the people of of Malacca, when she filled. The chief returned to *Battang Tiga* and assailed Malacca from the west; whilst Raja Haji and the men of *Rio* pushed it on the east. During these operations, the former went up to *Rumbowe*, where he espoused the grand-daughter of the Eang de per Tuan, *Raja Alum*, and afterwards proceeded to *Sungie Bara.* During the interim succours arrived for the Dutch garrison from Batavia.* Inspirited by this the men of Malacca attacked the post of *Teloh Katàpang*, with nine ships from the sea, while a strong party of soldiers landed at *Perno*—Raja Haji's stockade was surrounded. He called upon his Panglimas (war chiefs) and those that were present, to join him in an amok (*Mengamok*). They and their leader perished, and *Teloh Katapang* fell into the hands of the enemy. *Dyeng Salikan* and *Panglima Taling*, and many others, besides Raja Haji and his people, whom the writer cannot enumerate, were among the slain. The remainder fled to *Muar*, whence they sailed to *Rio* with the sultan of Johore. Sultan Ibrahim hastened from *Sùngie Bara* to *Battang Tiga*, but all was lost and he returned to *Salangore.*" So far the translation. The Dutch send vessels and expel Ibrahim from Salangore. He flees to *Pahang.* The Dutch take Rio† A. D. 1785. Ibrahim recrosses the peninsula and surprises the Dutch garrison at *Salangore*, which he retakes, but is again compelled to accept terms from the Dutch, who send up a strong force from Malacca to chastise him. An amok of the Dutch takes place at Rio, instigated by the sultan of Johore Mohmud. The Dutch flee. The sultan goes to *Lingga.* An expedition sails from Malacca and retakes Rio.

* A squadron under Admiral Von Braam.

† The expedition that sailed from Malacca to take possession of Rio in 1785, was headed by Christian Godliet Baumgarten as Commissioner. Murhum Jangote was elected Muda. Raja Jaffer the present Muda was elected in 1807.

The sultan quits *Lingga* for *Pahang* and thence takes refuge in *Tringanu.* Applies to the Raja Kechil of *Tringanu* and the sultan of *Salangore* to afford their mediation between him and the Dutch. The latter visits Malacca for this purpose, but the Dutch refuse to listen to him.

At this period the British assume possession of Malacca and Rio, and give up the latter unconditionally to the sultan of Johore, who, placing it under the authority of the Tumungong, settles at *Lingga.** The Muda of Rio, Raja Ali, goes and resides at *Muar.* Jarrings between the Malay and Bugis factions occur. The sultan of *Salangore,* with Raja Jaffer of Rio, his younger brother Raja Idris, and other chiefs, attacks *Perak.* Returns to *Salangore* and forms an establishment at Calang.

The MS. contains other information concerning the chiefs of *Siac, Indragiri, Quedah,* and *Menangcabowe,* but is chiefly valuable in filling up the *hiatus* in the history of the fallen dynasty of the Mahomedan kings of Malacca, from the 17th to the end of the 18th centuries. It is a copy of a MS. in the possession of the Count Von Ranzow, late resident at Rio, which, he informed me, was presented him by a prominent actor in the latter part of this history, Rajah Jaffer, Viceroy of Rio.

Part 7.—Contains copies and translations of inscriptions engraved on the seals of the princes of the following Malayan States, taken from their letters :—

Johore	Malay Peninsula.
Quedah	
Salangore	
Pahang	
Tringànu	
Kalantan	
Rumbowe	
Srimenánti	
Mùar	
Sungie ujong	
Lingie	
Siac	
Bukit Battu	Sumatra.
Menangcabowe, and	
Assahon	

* As soon as the Dutch again occupied Malacca in 1818, they hastened to repossess themselves of what we had given up in 1795. and sent Adrian Kock to Rio to negotiate with the Malays for the transfer of the Island to the Netherlands Government, which was effected on conditions of their paying the Muda annually 45,000 Java rupees. Captain Elhout was put in charge.

No. 4—Contains—1st. The genealogy of the kings of Malacca and Johore, down to the last sovereign Mahomed Hussain Shah, who died at Malacca in 1836.

2d. The genealogy of the chiefs of Muar.

3d. A copy of Part 5, MS. No. 3.

4th. The genealogy of the Panghulus of Naning.

5th. The genealogy of the Capitan Malayu of Malacca.

6th. A Malay Kutika. Table to ascertain the year of the Hejira—the month of the year, and the day of the month. Indications by attention to which the sailor and traveller may discover propitious times to set out upon any expedition, and whereby storms and tempests may be avoided.

7th. A collection of maxims and proverbs.

8th. A terassul, or forms for letter writing.

No. 5—Contains—1st. The maritime code of Johore, to which are appended some regulations affecting occupiers of the land, and others touching Port customs.

2d. A terassul, or Malayan forms for epistolary correspondence. The etiquette to be observed by a sovereign in addressing his commands to the different officers of state. In addressing a sovereign. Equals writing to equals—superiors to inferiors—inferiors to superiors. Also rules shewing the proper places for affixing the seal conformably to the relative ranks of the addresser and the addressed.

No. 6.—*Hikayet Patani.* This is a history of the Malayan principality of Patani, now a province of Siam. The preface declares it to be a story received orally by the writer (whose name as commonly the case in Malay MSS. is not mentioned) from aged men, regarding the origin of the Raja who first founded this fine state. To the grandson of *Piatu Karub Maha Chun,* Raja of Kota Malikei, named *Wirin Piatu Nakapa Sulma,* this honour is given, probably, by the Mahomedan author because *Nakapa* was the first Mussulman prince that reigned over this country. He reigned under the title of *Sultan Ismail Shah.* Before *Ismail Shah* we find the names of two Kafir princes, viz. *Raja Kurub Maha Chun,* just alluded to as the grandfather of *Ismail Shah,* and *Piatu Antara.* Ten sultans and a sultana of this dynasty, after which commences the Kalantan dynasty, with Sultan Bakab.

The following princes of Patani are enumerated :—

Raja Kurub Maha Chan.
Piatu Antara.
" Nakapa or Sultan Ismail Shah, the first Mahomedan sovereign.
Muzuffer Shah.
Manzur Shah.
Patek Siam.
Bahadur.
Raja Ijo.
" Iju.
Paduka Shah Alum.
Kuning or Perachu—female sovereign.

Kalantan dynasty.—Bakal.
Amas Kalantan.
" Jayam.
Dawi Perachu—female sovereign.
Paduka Shah Alum.
Lacsamana.
Baginda.
Along Yunas or Iang de per Tuan.

Along Yunas was killed in battle; after his death Patani fell into a state of anarchy, and has since never had a Raja or Bandahara. The last Bandahara was Dattu Tarab. With a brief account of an invasion from Siam, and some curious instructions touching the *Noubet* and the twenty-four *Ragams* or musical modes, the work closes. Mahomedanism was introduced into *Patani*, according to the author of the *Hikayet*, during the reign of the third prince, *Piatu Nakapa*, converted by a man of Passi named Shaikh Syed, who cures the prince of a deadly disease, on condition that he will embrace Islam.

A description of the founding of the city of *Patani* occurs in the commencement of the MS. of which the following is a tolerably literal translation.

" *Piatu Nakapa* was much addicted to the pleasures of the chace. As he was one day seated on his throne surrounded by his *mantris*, *Pagawyes*, *Hulubalangs* and vassals, he observed " I have heard that there is great abundance of game near the sea shore." The mantris performed obeisance and said " The commands of your Majesty are just, your slaves have also heard it." *Piatu* exclaimed, " If it be thus, let all our vassals be assembled; for to-morrow we will go forth and

hunt on the sea shore." The *mantris* and *hulubalangs* performed obeisance and said "On our heads be the commands of the king." The morrow arrived, and the prince set out, accompanied by all his ministers and officers with a long train of vassals. On reaching the hunting ground, they halted, and an encampment was formed. The prince dismounted from his elephant, and held an audience in his pavilion, at which the whole of his nobles and vassals were present. The royal mandate was issued, that some of the attendants should be sent to look for marks of game. This was done, and it was represented that numerous deer tracks were visible in the forest skirting the sea coast. The prince on this issued directions that the hunt should take place the following morning. Accordingly on the morrow nets and snares were in readiness, and the royal attendants plunged into the thicket to drive the chace into the toils. The day however had considerably advanced without a single head of game having been caught. The prince was much astonished and ordered his own dog to be loosed. The hound after about two hours quest gave tongue. The prince soon distinguished its cry, and following the sound came to a creek, where he fell in with the huntsmen who had also followed the dog. On asking them what the hound had started, they informed him that the chace was a white chevrotin (plandok), glittering and as large as a goat, but that it had vanished away from their sight. The prince on hearing this set out in the direction of the place where the plandok had disappeared. After some time he arrived at a solitary house inhabited by an aged man and his wife engaged in fishing. The prince ordered his attendants to enquire whence they came, why they had settled there, and what was their origin. The old man answered that he was originally from Kota Malliki, had accompanied *Paduka Anakanda* to establish the country of *Kakayutia*, and was left behind here on account of sickness. The prince then asked him his name. The old man replied, the name of your slave is *Inchi Tani*. The king on hearing this, returns to his pavilion and founds a city on the spot, where the white plandok vanished, which was close to the *Pangkalan* or landing place where the old fisherman *Tani* pursued his vocation."

This account differs from that of the *Sejára Malayu* wherein it is stated that *Patani* derives its name from that of the old fisherman found on its coasts. Whereas the former, after mentioning that this is the most generally received tradition, gives it as his opinion, that Patani signifies the Pangkálan, or landing place where the plandok disappeared.

No. 7.---De Kron Aller Koningen, Van Bocharie, Van Djohare. This is a translation, with the Malay version annexed, of the celebrated ethic composition called the *Tajus-Salatin*, the crown of princes, by Roorda Van Eysinga. Selections from it were printed at Bencoolen, as a portion of the compendium of education used in the Fort Marlborough native schools. This work, with the *Hong Túah*, and *Katurunan Segala Raja Raja* were styled by Valentyn, " The three Jewels."

No. 8.---The Levensschets Van Sulthan Ibrahim, is the history of a monarch of *Irak*, borrowed from the Arabic, translated into Dutch with the Malays annexed as above, by the same author, who observes quaintly enough that it is a true history containing nothing incredible, and that all the Pundits agree as to its authenticity.

No. 9.---*Hikayet Isma Yatim.* This is one of the numerous historical romances so much prized by the Malays, but bears unquestionable indications of its Hindu origin. *Isma Yatim*, the hero, is a native of the country of *Kalinga*, or *Kling*, who raises himself by his wisdom and talents to the rank of prime minister of the Raja of Kandrapura. His good fortune and talents beget him numerous enemies. The story chiefly rests upon the wisdom and prudence he displays in defeating their various machinations, and his exemplary conduct as a minister of state.

No. 10.---The *Hong Tuah* is decidedly the most favourite historical romance the Malays possess. It is an account of the exploits of the bravest of the nine nobles, selected to attend sultan *Mansur Shah* of Malacca to Majapahit, on his visit to the *Bitara* of that ancient kingdom, of whose daughter, the beauteous princess *Radin Gala Chandra Kerana*, the sultan had by description become violently enamoured. *Hong Tuah*, after a variety of wonderful adventures and the taking of Malacca in 1641 by the Portuguese, of the siege of which an account is given, suddenly disappears and is not heard of more. Some say that he plunged into the forests of Perak and became chief of the wild tribes. The Malays imagine their favourite hero is in existence up to the present hour. To the MS. sent to the Society is appended a sequel, containing a narration of the capture of Malacca from the Portuguese by the Dutch and the sultan of Johore in 1511. There is a singular account of Hong Tuah's embassy to *Istambùl* or Constantinople, where he is despatched by the Sultan of Malacca, together a description of that city with its many gates.

IV.—*Some additional Notes on the Hill Inhabitants of the Goomsoor Mountains, with the translation of a Telugu paper, containing an Historical Narrative of B'honju Family, Feudal Chieftains of Gúmsara.—By the Rev.* W. TAYLOR.

The account published in the sixteenth number of this Journal concerning the hill-people of the Goomsur wilds, having elicited a few observations from a gentleman at Ganjam, they are inserted. It is only by attending to various evidence that truth can be arrived at, and hence every testimony to a point not definitely settled has its value, best adjusted afterwards by comparison. The first communication on the subject is to the following purport:

"I think there are some errors regarding the name of the Khonds in the last No. of your Journal, and I point them out with a view to enable others to get at the truth. They are never termed *Khoonds* by any class of natives of the country about here. We English are capital hands at distorting names, and this is an instance of it. The term is *Khond* on the Madras side of the country—but directly the frontier is crossed, the word is pronounced Khunds (short). It is a Wodiah word, and I enclose it written in the Ooriah character.* The Ooriahs in Ganjam (who from their constant communication with the Telingas have in some measure corrupted their own language) say Khondoo, and this is in common use with the Telingas who usually add the final oo to a word they adopt. Thus if they brought the word hill into use from the English, they might say hilloo and plural hillaloo.

"The term in the *Telinga language* is softened to Codoo or Codoo wadoo, plural, Coduloo and Codoowanooloo—and is just as much a guidance to the name of the people of the hills, as the English pronunciation Masulipatam is to Mutchleebunda or Mutchleeputnam, or the word *Pariss,* as we call it, to the French *Paris.*

"I apprehend there must also be a mistake in the term "Khoi jati," which is nothing more or less than two simple Ooriah words, signifying "what caste." The same precisely as you might say "*ka zât*" in Hindostanee.

"There are tribes in the interior called Gones; there is some difference in their customs, and they do not intermarry with the Khonds. There is no great difference in their appearance. None of these people have the slightest resemblance to Bheels in their looks.

* In a future No. we hope to give these characters, for which no type exists at Madras —*Editor.*

"The Ooriah language has closer affinity to the Khond perhaps than any other, and all the Deegalloo (Khond village accountants) speak and write Ooriah, as do many others among the Khonds.

" The Khond is not a written language but they readily understand Khond written in the Ooriah characters, a method frequently adopted during the late operations.

" I may also remark that I have learnt from both the Collector of Pooree and the Commissioners in Cuttack that *pure Ooriah* is spoken in only a very small tract of country—being generally mixed with Hindostanee on the Bengal side, and with Telinga in the Madras provinces.

" With a common acquaintance with Hindostanee, one can understand many common-place sentences of Ooriah, as spoken in the Pooree Collectorate.

" The above is exemplified in Dr. Maxwell's list—as, for " man," the Wodiah is put as manusha, evidently the Telinga manchee. The Ooriah for man is " wondera." The Ooriah for " *one*" is " *gottee.*" " *Ekke*" is evidently the Hindostanee word—these are in common use in *Ganjam,* but are not Ooriah.

" The word for milk is an adopted Telinga word ; but *Doodh,* with a strong aspirate, is more common—from the Hindostanee.

" There is a strong resemblance, in sound at all events, between the Ooriah mal and maliah, signifying a hill, and a hill district, to the Mally of the south.

" I am *no linguist,* but get my information from a Brahmin who speaks and writes all the languages spoken here."

' The contents of this paper may be briefly adverted to. The mere difference of the vowel sounds in short *o,* and *u,* when the ear only is in question, is insignificant. Even an ear somewhat disciplined to distinguish between articulate sounds, will fail in this particular discrimination, if attempting to write down a proper name as enunciated by a native of India, when those vowels occur, and a reference to the written letter, when available, is always requisite for precision. For example, a person writing by ear, would be as likely to write *B'hunjo,* as *B'honju,* though the latter is correct according to the orthography of the name. The mere difference in pronunciation between *Khonds,* and *Khunds,* on different sides of a frontier seems unimportant. As to the singular and plural in Telugu, *u* and *lu,* the remark must be familiar to the merest tyro in that language. In the paper in question,

near the beginning, it was expressly said, that *Codulu* is plural. The addition of "wanooloo," or correctly *vándlu*, to the singular, is merely adding the personal pronoun in the third person plural to the singular of the noun, a custom not unusual in Telugu. The words in the *Uriya* character and language, yield no more aid, as to the native *Khond* plural, the *Uriyas* naturalize the word with their own plural *máni*, as the Telugu with their plural *lu*, and we English with our *s*. With respect to the statement that *Khoi-jati* is synonymous with *ka-zát* in Hindustani, some hesitation is felt. Dr. Maxwell could perhaps best explain this little point. But since it appears from papers in the Mackenzie Collection, that a wild class of people is scattered over the peninsula, termed (still in Telugu writing) *Cóya-játi;* it may be that the term Khoi or Cóya, is not a mere interrogative pronoun, but a proper name. The wild people in question are stated to be subdivided into *Chenju-vándlu, Yánádulu—Cóya-vándlu,* and *Irala-vándlu,* in which terms the Telugu plural is conspicuous. These people differ in minor customs, and some of them would appear most to resemble the Goomsoor mountaineers, others the Bheels, and an intermediate class may be the *Gones.* It is not known how this latter word is to be pronounced; whether *Go-nees,* or *Gôns:* the latter rather is supposed, and if so, this epithet or title is familiar to more Southern India. It is found in inscriptions; and was also borne by the race of *Ananta-kon,* formerly rulers of the hill fortress of Ginjee. However, not to rest undue weight on any minor point, it is tolerably evident that there are extensive tribes scattered throughout India not strictly speaking *Hindus.*

Any coincidence of the Khond with the Udiya, or the Telugu, by no means disproves the probability of an earlier common dialect, from which all may be dialectical departures. As to the particular word *manusha,* it is Tamil, wanting only a nasal *n* at the close; but this word is also Sanscrit *Manuja,* whence it may have been derived, or the Sanscrit may have adopted it from the common primitive dialect. The coincidence between the *Udiya* and Tamil word for hill, adds a particle of evidence to the probability of an early common dialect throughout the peninsula.

A later communication from the same gentleman, is the following :—

"The accompanying Telugu translation of a Wodia (abridged) history of the Bunje family (late Rajahs of Goomsoor) has been sent me by a very intelligent Bramin, Sooriah Narrain Pantalloo, the tasildar of Goomsoor, with a request that I would forward it to the Literary So-

ciety. I do not know whether it may be pronounced worth publishing, and moreover it contains a somewhat obscene legend of the origin of the race. Sooriah Narrain, however, will be flattered, I dare say, if you find any thing in it worth noticing. The translation in English will be better done at Madras than by any person I have here, so I send you the original.

" Sooriah Narrain, who is one of the best *English* scholars I know, wrote to me thus the day before yesterday.

" I am glad your honor is getting the history of the Bunje family " translated, and would like to see it in print. I have read lately " some account given by Dr. Maxwell and the late Mr. Stevenson, " of the Goomsoor Malia inhabitants; in which Dr. Maxwell put " in Kodaloo or Bauvoorus (our regular Commissariat bearers) among " the Malia inhabitants, and spoke a good deal of their marriage " ceremony. Not a single soul of these is the inhabitant of the jungles " as far as I can learn. As I have now scarcely time to arrange all my " gleanings of historical enquiries of this country, I will write you by " another opportunity a correct account of the Goomsoor Malia inha- " bitants, their customs, religion, language, &c. &c. as I was informed by " the Janus, or the bishops, of Coomingia and Goonjabad. The Khonds " consult the Janus both on spiritual and temporal matters, and they " (the Janus) have as much authority and influence in Khondistan as " the former Popes had in Europe, implicated even in civil wars. " These Khondish divines or reverend gentlemen further substitute " their superstitious ceremonies for medical aid for a Khond patient."

The latter sentences will amuse you, if you have patience to read what I have copied. His remarks confirm my objection to the word Coduloo in my former note, as I have had no communication with him on the subject. Other castes mentioned in the list are not Khond also. Sooriah Narrain places the error on Dr. Maxwell's shoulders—as of course he could not accuse his late master, the Commissioner, of committing an error. The cutcherry servants who compiled the memoranda of Mr. Stevenson were just as ignorant of the Khond language as the Europeans, and wrote it down in Telugu according to the sound in *their* ears. So that the list cannot be taken as a fair criterion to judge of the language, &c."

The difference between the Commissioner and the Tahsildar, cannot be adjusted by a third person at a distance. What remains, therefore, is for the Tahsildar to get ready, and send in, his better account, that

the two may be compared together, and the correct one appear. By the way the sun of intellect *Sooria* Narrain, has not stated what his Brahmanish divines have been in the habit of substituting for medical aid; perhaps he will give the information next time. And he may be assured that there have been too many Popes in all religions; his own being by no means excepted. For the rest, and until the more authentic statement shall appear adjusting the matter, now *sub lite*, as to the Khonds, all that remains is to advert to the Telugu manuscript, sent by *Surya Narraya Pantalu*, to his correspondent, and forwarded by the latter to the Editor of this Journal. Curtailing the impure legend, which its author would regard most probably as ornamental, at the commencement, a translation of the paper has been made, and is here presented.

HISTORICAL NARRATIVE OF THE RAJAHS OF GOOMSOOR.

(Translated from a Telugu manuscript).

In the *Tréta-yuga*, two sons were born to *Vasishta*, the *rishi*, respectively named *Madanatu*, and *Modàcutu*. While bringing up these children, *Vasishta*, from their appearance, considered that they would become *Cshetriyas*; and, accordingly, investing them with the sacred thread of that order, he had them taught martial exercises so as to become skilful in the use of the bow, and other such accomplishments; especially the *astra mantras* (or charms connected with the use of the various kinds of arrows). Such being the case, he told them, that, having now become skilful, they would each become king of a country: that they were *Cshetriyas;* of the *Surya* race, and, as born of himself, would be entitled to be called of the tribe of *Vasishta*. On receiving these instructions, they paid him reverence, putting his commands upon their head; and both elder and younger brother having come to the *Chinttala-desa*, they conquered the king of that country by the power of their arm, and took possession of the entire country. The elder of the two sons *Sri Madanarona* ruled the kingdom. Subsequently *Modacu B'honju* coming to *Svarna-rec'hadad'hi*, a place so called, subdued to himself many districts; he gave to the country his own name, and built a town at *Hari-hara-puram*. He married the daughter of a king named *Juhana*, who ruled the *Samala* country, and had two sons. These two sons disagreed between themselves; and, dividing the country into two portions, they each ruled over one of those parts. The

elder one residing in *Hari-hara puram*, ruled over a country containing to the extent of one hundred and sixty coss*. The youngest ruled at *Cendujaci*, over a country containing one hundred and twenty coss. After the lapse of some generations, the ruler (name not mentioned) had to maintain a dispute with his uncle (the younger brother of his father) concerning the portion which the latter claimed. As the king would not surrender that portion, that uncle, named *Dohitari B'honju*, with seven householders, and his two sons, named *Rag'humad'ha Bhonju*, and *Bonamali B'honju*, retired into the *Baud'hu* country. In that *Baud'hu-desam*, a *Brahman* ruled, named *Dinabaud'hu* of the *Castrapa* tribe of the race of *Naudda*. The aforesaid *Daitari*, united himself with that *Brahman*, and, explaining all his affairs to him, as that king was a sea of bounty, he bestowed on him a great many favours, and kept him near his own royal person. After some time that *Doitari* died, and as the king had no children of his own, he adopted those two sons, *Rag'hunad'ha*, and *Bonamali*, having them invested with the sacred thread by his own tribe. While bringing them up, by Divine appointment, a son was born to himself to which the name of *Vinayacutu* was given. As soon as this child attained the age of five years, the *Brahman* king reared up the three children without making any distinction between them. One day while these three children were playing together, they mounted together on an elephant; when the two adopted children, agreeing together, cast down *Vinayacutu* the *Brahman*-king's own son, and caused his death under the feet of the elephant. They then came with tears, and themselves announced the fact to the king, stating it to have accidently occurred at *Hacund'da* in the *Bot'ha-desam*, but the persons who were with them, charged them with the wilful commission of the crime. As the king was a very wise and prudent man, he did not take any proceedings against them, but, considering that he had adopted them, and that were he to have them put to death, his race would become extinct, he called them both and said to them, " In the first instance, I adopted you as children; subsequently " a child that was born to me is by divine appointment now dead; if " this death occurred by your contrivance, then discord well arise in " your race between father and child, between elder and younger bro- " ther; while, by every one ruling the kingdom, flatulent diseases " (swelled legs, wens on the neck, &c. &c.) and leprosy will have to be " borne: they will do what ought not to be done, and afterwards en-

* The measure of the coss, in the Cuddapah district, is about two and a quarter English miles.

" quire with grief why they did it." With this malediction he dismissed them, and, after some short time, died. Afterwards *Rag'hunad'ha B'honju,* the elder son ruled the kingdom. His younger brother *Bonamàli* proceeded with an army against the forts in the south quarter, the commanders of which with common consent had revolted, and he subdued them; which event occurred in the era of *Salivahana* 754 (A. D. 832). About that time, he formed an engagement with his minister, or chief adviser, named *Chocca-Baddu,* a courageous general, and assimilating to himself those commanders whom he pardoned, he punished the others who refused to submit, and having come to a great distance, he saw at a certain place indications,* which induced him to fix on that spot as a residence, to which place he gave the name of *Gumsara* (*Goomsoor*). During a year or two of residence he assumed to himself some extent of country on four sides, and ruled there. Sometime afterwards, *Rag'hunad'ha B'honju,* ruler of the *Baud'ha* country, hearing by means of his *harcarras* concerning the proceedings of his younger brother in the *Gumsara* country, took umbrage, and consulted about taking means to overcome him. But subsequently reflecting that the other had troops under his command, and had lined with guards, as he heard, all the passes of the mountains, moreover that he was his brother, he considered that as they both had cut down so much forest and cleared so much land, it would be best that each should rule over his own portion, and with these considerations he remained quiet. Being undisturbed, *Bonamali B'honju* increased the number of his adherents, and clearing forest lands, which were turned into cultivated fields, he had hamlets and villages built, and comfortably accommodating himself, and the ten heads of families, who, with all belonging to them, had first accompanied him, and governed with increasing prosperity. Being successful in all things, this chief ruled twenty-one years. His son named *Arjuna B'honju* ruled fifteen years. His son was *Cesava B'honju,* whose rule was eighteen years. As this chief had no children, his younger brother *Bonamali B'honju,* with his son *Gopala B'honju* ruled for twenty-three years.

The son of *Gopala* was *GovindaB'honju,* who ruled for fourteen years; and his son was *Jaganadha B'honju,* who governed eleven years. *Hari Crishna B'honju,* his son, ruled ten years. *Gòcula B'honju* his son governed fifteen years. His son was *Gaura-hari B'honju,* who ruled

* I have used a general expression, not having been able, after every research, to discover the exact meaning of the word సొరొ (*soro*) which is employed in this place.

twenty years. As the last had no child, his younger brother *Crishna B'honju* ruled sixteen years, and the following sons in direct descent:—

Narasimha B'honju	18	years.
Balab'hadra B'honju	31	„
Mucunda B'honju	16	„
Mad'husudana B'honju	15	„
Narrayana B'honju	19	„
Hirad'hara B'honju	15	„
Nara-hari B'honju	18	„
Jaganad'ha B'honju	21	„
Matta-hasti B'honju	19	„
Purushottoma B'honju	10	„

As this last had no child, his younger brother, *Harisarana B'honju's* son, who was named *Pratapa B'honju*, governed. He was celebrated, conquered his enemies, and having killed *Culla Cond'ho*, the *Codu-raja* (chief of the wild mountaineers, or *Khonds ?*) he built a fort, after that king's name, *Collada Cotta*, and, making it his metropolis, ruled seventeen years. His son was named *Vajra d'hara B'honju*, who ruled ten years. As he had no son, his younger brother, *Harisaranu B'honju*, ruled thirteen years, and the following sons in regular succession.

Capila B'honju	27	years.
Sri-d'hara B'honju	15	„
Rama Chandra devu	21	„
Lacshmana B'honju	15	„
Trivicrama B'honju	18	„
Hari Sevaca B'honju	17	„

As he had no child his younger brother *Gadad'hara B'honju* ruled 15 years, and the following sons in succession.

Dayanid'hi B'honju	21	years.
Giri d'hara B'honju	19	„
Cripa sind'hu B'honju	12	„
Padmanab'ha B'honju	17	„
Mad'hava B'honju	15	„
Camala lo'chana B'honju	13	„
Hari hara B'honju	14	„

His son *Patili Gopinád'ha B'honju* acquiring great fame, ruled with splendour, and while doing so, the king of *Jaganad'ha* named *Narasinha Gajapati* was a cotemporary prince, ruling over the country, which lies midway between the Ganges and the Godavery river. He married a younger sister of that *Gajapati* prince; and when, on that occasion, he went in his carriage on a state elephant to the palace of the *Gajapati,* as he could not enter by the lion-portal (cause not specified) he had it taken away, and another entry made, by which he came to the audience. The *Gajapati* highly estimating so valiant a chief, added to his name *Gopinad'ha,* the epithet of *Pátili* (conceived to mean "son of the bold") and this *Patili Gopinàd'ha B'honju,* ruled twenty-two years. His son was *Devéndra B'honju* who assumed to himself kingly honours; and, while so ruling, went on a sacred pilgrimage to the shrine of *Jaganàdha.* While there one day, he went out with the kingly umbrella, and cow-tail fans, which coming to the ears of the king of that place, he gave orders to his servants, to strike down the bearers of those ensigns, and to bring these latter to his presence. When the troops came to execute this order, the chief pacified them, and came himself to the presence of the king. On the latter asking, "Why do you come into my dominions with royal insignia?" *Devendra B'honju* answered, "If I am not a *raja,* then you are not a *Maha-raja,* on which account I assumed these emblems, to add to your dignity." Pleased with this dexterous reply, the king consented to his using kingly ensigns. With them he came to *Cuspa desam,* and with splendid reputation, from making many groves and water reservoirs, he ruled twenty-two years. His son *Yádavendra B'honju,* ruled 17 years, and the following sons in succession.

Vrishticésvara B'honju	18	years.
Pitampara B'honju	21	"
Nalinácsha B'honju	12	"
Trivicrama B'honju	10	"
Godàvari B'honju	16	"
Gajéndra B'honju	15	"
Gopála B'honju	22	"
Bonamáli B'honju	3	"

His younger brother *Gopinàd'ha B'honju* killed the king, and making himself king, he built a row of houses for the *Brahmans* called *Gopinad'ha-puram,* and ruled twenty-two years. His son was *D'hanurjaya B'honju,* who was handsome in form, and wise and prudent in mind; in consequence he protected the people like *Devendra.* He

was attached to music of his own performance; entertained one hundred and forty poets (or minstrels) to whom he appropriated the sum of seventy thousand rupees to be given out from time to time, and keeping many concubines, with elephants and horses, he appointed his younger brother named *Govinda B'honju*, as second chief, or ruler, and gave himself entirely up to pleasures. He had eighteen sons born to him, of whom *Gangad'hara B'honju* was the eldest. He was a son of the crowned wife. The son of the latter was *Sattrunjaya B'honju.* As to his younger brothers, since it would require much writing were details given, the doing so is omitted. The concubine of the before mentioned *D'hanurjaya B'honju* was *Hadu-devi* also called *Svagi-maha-devi*, by whom he had a son named *Nila-candha B'honju.* As this *Svagi-maha-devi* was greatly in favor with the said *D'hanurjaya*, he allowed her to have entire control over his wealth. The chief himself, together with his property, being entirely at her disposal, she considered in her own mind, that so long as the legitimate child (*Gangad'hara*) and his son (*Sattrum-jaya*) and the chief's younger brother (*Govinda*) were alive, her own son (*Nila-cand'ha*) could not come to the chieftainship; on which account she meditated the means of removing those three persons by death, and as eight of the other children (out of the eighteen) were devoted to the elder legitimate son, she also determined on their removal. At this same time by divine appointment *Asvád'háma** appeared and came to *Collada-cota.* The chief obtaining a sight of him, and knowing him to be an illustrious personage, caused him by civilities to remain for some time. The chief having some anxiety as to which of his children would succeed him, enquired of the sage in terms of homage, which of them would be his successor, seeing that they were all of them powerful men. *Asvád'háma* replied that if on the following day he would cause all his sons to be assembled, then it should be told him, which of them should succeed to the chieftainship. On the following day the chief had all his sons assembled, and shewn to the sage; who then privately told the chief that no one of his sons would succeed him, but that *G'hana B'honju* the son of his younger brother (*Govinda*) would inherit his authority. The chief, though greatly grieving, yet considered the deprivation of his sons to be an act of divine appointment. The aforesaid *Hadu-devi*, stiled *Svagi-maha-devi* now said to the chief " your younger brother's son *G'hana B'honju* greatly molests both me and the people of the country, and

* This is the name of the son of *Dronacharya* in the *Mahabharata*, who survived the great war, and is fabled to be not liable to death.

leads a very bad life, while on account of your regard for your younger brother, you do not check him: if he were sent away out of the country it would be a good thing." The chieftain hereupon called his younger brother, the second in authority, and said to him "if you love me, send away your son *G'hana B'honju* out of the country." The second in power not wishing to disobey, sent his son into banishment. That *G'hana B'honju* went to *D'hara-cota*, and received a hospitable welcome from the *raja* ruling there. Thus *D'hanurjaya B'honju*, listening to the speech of a woman, sent away his brother's son, though not without some inward compunction: and under the same influence he sent his younger brother himself to attend to some needful affairs' near the person of the *Jaganad'ha raja*. *Svagi-maha-devi*, now had her son invested with the authority before held by the chief's younger brother, and the country was placed under his management. Thereupon *Svagi-maha-devi*, considered that the chief was seventy five years old, having ruled during sixty years, and that if he were put to death then, her son would come into the complete possession of the chieftainship. The chief had always been in the habit of having the cream of milk made into a preparation for his daily food, and it had always been made for him by a *Brahman* woman named *Tolochompananni*, who, being tampered with by the said *Svagi-maha-devi*, and under her instructions, mingled poison with the said food, and the chief having eaten of it died in the house of *Svagi*. Subsequently this same *Hadu-maha-devi*, sending for her son *Nila-cand'ha B'honju*, said to him, "the old chief is dead; go now and put to death the eldest legitimate son and his son also, and then rule the country thyself." *Nila-cand'ha B'honju* consenting to her advice, went to the eldest legitimate son, and calling him respectfully, said, "O elder brother, our father is gone to the other world, be pleased to come and take on you the government." The elder brother afraid fastened the door, and hid himself within, but the other one had the bolt wrested from the door, and entering seized on and cut down the legitimate heir. His son *Sattrunjaya* hearing of what had occurred, fled for his life from the palace; but as this was guarded on all the four sides, a wretch saw him trying to escape, and killed him with an arrow. The wife of this *Sattrunjaya B'honju*, who was named *Monda-devi*, by divine appointment was pregnant. *Svagi-devi* pointing her out to her son said "thou hast killed the serpent, leaving the tail in which is venom: if she and her infant are not killed how art thou to reign?" *Nila-cand'ha* heard what she said, but instead of killing her, confined her in prison. *Nila-cand'ha*

who had killed three persons in one day, now became lord paramount. At this time the province of *Gumsara* had become subject to the Moghuls, and paid a tribute of five thousand rupees. The said ruler further put to death several persons who were well-disposed towards *Mondà-devi*, confined in prison. *G'hana-B'honju* in the *Corada* country won over the people of *Máluvà* (or Maliva), and these people took occasion, at a time when the guards were all engaged in attending to a dance, to enter the prison, and carry off *Mondà-devi* to *Baduva*, a village in the *Corada country*. She was there delivered of a son. *G'hana B'honju* had the child called *Rana B'honju*; he remained together with the child in Maliva, and thence, from time to time, carried on a warfare against *Nila-cand'ha B'honju*. He also caused information to be sent to his father *Bonamali B'honju* (before called *Govinda*) at *Jaganad'ha*, and this latter got together some troops; with the assistance of the *Nuvagada raja*, they together entered the *Mut'ha* (rented district) of *Jaganad'ha Prasadu*, and carried their ravages as far as *Collada* (the before mentioned fort of the chieftain). *Ghana B'honju*, assembling the *Maliva* people, and entering by the village *Garada*, fought on his way to *Collada*. *Nila-cand'ha B'honju*, unable to maintain possession of the fort, quitted it on foot, and during two years (nominally) held the chieftainship, and then retired to *Arugada* of *D'hara-cotta*. In this country a son was born to him named *Ubendra B'honju*, who after becoming highly distinguished for talents in singing, died. Subsequently, when war had ceased, *G'hana B'honju* had *Rana B'honju* installed in the chieftainship over the *Gumsara* country, he himself managing the government; and when *Rana B'honju* attained the age of five years, he cast him into a well, and taking that *Maha-devi* (the child's mother) to himself, he himself ruled the country. The *Côdula* people in the *Maliva* country, hearing of this murder of the young *raja*, raised a great disturbance, and during the commotion, the *Nuwab* (name not mentioned) assembling a force came, and taking *G'hana B'honju* prisoner, confined him in *Asíca* (a town so called). The *Nuwab* had a very fleet horse whom no one could ride; and it being allowed *G'hana B'honju*, to try and subdue the animal, he mounted thereon; and, unknown to any one, entered his own country, where he again stirred up an opposition to the *Nuwab*, who admiring his behaviour restored him to the chieftainship. While *G'hana B'honju* ruled, the *Gajapati raja*, named *Rama Chandra*, had associated himself with the Mahomedans, and adopted their religion; but his queen, from an unwillingness to forfeit

her caste, retired to *Aragadà.* As the king there did not protect her, she went to *Gúmsara*, and being hospitably received, she (being before pregnant) had there a son born to her called *Vira Cesáva devu.* The *Gajapati* prince hearing of the circumstance came against *G'hana B'honju* with a military force, and sent a message to *G'hana B'honju* to this purport— "Will you give up my wife and child? or will you come out and fight?" *G'hana B'honju* fought with the *Gajapati* and defeated him, so that he fled away on foot, and died (of wounds?) in a garden at *Narasinha-puram.* The Mahomedans learning these circumstances created much trouble in the *Odissa (Orissa)* country; which intelligence reaching the ears of *G'hana B'honju*, he took the part of *Vira Cesava devu*, and after defeating the Mahomedans installed him in the sovereignty of the *Sri Jaganad'ha* country, on which account *Vira Cesava* conferred on him the title of *Cshetriya-vara-devu*, and honored him with presents. *G'hana B'honju* returning to his own country, built an *agraharam* (*Brahman's* street) which he called *Cshetriya-vara-puram.* He acquired great fame. By one of his wives he had a son named *Bairagi B'honju.* He had also other sons, respectively named *Hari-sevaca B'honju*, *Crishna B'honju* of a mother of the *Dasa-palla-varu* tribe, *Vasu-deva B'honju*, *Dinábond'hu B'honju*, *Cunjavi-hari B'honju*, *Rana-chandra B'honju*, and *Cesáva B'honju*, eight in all. He ruled thirty-eight years. While his son *Crishna B'honju* was ruling, *Bairagi B'honju* with his younger brother went away on foot, and gave his younger sister to *Vira Cesáva devu. Hari-sevaca B'honju* had no posterity. During the rule of *Crishna B'honju*, one named *B'husa* B'husi*, having come, destroyed the fort called *Vishnu Chacra*, and imposed a tribute of fifteen thousand (rupees?). This chief *(Crishna B'honju)* acquired celebrity, gave his weight in gold, and other donations *(to Brahmans)*, consecrated an image named *Sri Narrayana-svami*, in *Narrayana-patnam*; built several other fanes, and excavated reservoirs. He erected two *agraháras* (*Brahman* streets) one at the town called *Narrayana*, and one at the town called *Crishna-sarana.* He maintained perpetual lights in several fanes, and had sacrifices conducted by *Brahmans.* By a daughter of the ruler of *Dhàra-cotta* he had a son named *Lacshmana B'honju*, his eldest son. By a daughter of *Navaga-daru* (name of a chief or tribe) he had a second son named *Vicrama B'honju.* At the time of the latter's marriage, the father nominated him as second in authority, and conse-

* It seems probable that this is the Telugu author's mode of expressing the name of the French commander, Monsieur Bussy.

quently his successor, though the youngest son. By a daughter of the *Ravutvaru*, he had a son named *Jaya-mangala B'honju*. By a daughter of the *Surada-varu*, he had another son named *Padmanàb'hu B'honju*. By a daughter of the *C'halli-cóta-varu*, he had five sons named *Lacshnu-sarana B'honju*, *Sita Rama B'honju*, *Ranga-nadha B'honju*, *Narsinha-sarana B'honju*, and *Vishnu-sarana B'honju*. By a daughter of the *C'hemidi-vàru* (Kimedy chief) he had *Hari-sarana B'honju*. By a daughter of the *Dasapalla-vàru*, he had two sons *Hari-rudra B'honju* and *Siva-raina B'honju*. While ruling with these children the *Nuwab* having favor towards him, gave him some additional towns and districts. In the thirty-fourth year of the rule of *Vira Cesava* (of *Orissa*) the English having acquired sovereignty, and during the rule of *Catussa D'hora* (the former word is intended to express some English name) the tribute (of *Goomsur*) was fixed at twenty-five thousand. In this way (*Crishna B'honju*) ruled thirty-eight years. His son *Vicrama B'honju* greatly molested the people, and his elder brother *Lacshmana B'honju* took refuge with the English, who nominated him in place of his younger brother, and fixed his tribute at forty-five thousand. After four years *Ullen D'hora*, having come, and having demanded fifty thousand, *Vicrama B'honju* did not agree thereto. He repulsed an army sent against him, and when the English threatened to put *Lacshmana B'honju* in his place, he quitted his fastnesses, and went by a private road to Madras, where through the assistance of *Vijaya Rama-raja*, he was continued in power, and returning he put things in order, but did not pay his tribute, and conducted matters internally, without good faith, so that the English offered the authority to *Lacshmana Bhonju*, on the condition of his paying off the arrears of tribute, in ten years at the rate of a lac yearly, and then afterwards paying sixty thousand annually. To this proposal no one assented; in consequence the *Turan* Nabob gave the government to *Lacshmana B'honju* and confined *Vicrama B'honju* in prison at Ganjam. *Vicrama B'honju* ruled turbulently without keeping good faith as to the tribute, for seven years. But *Lacshmana B'honju* was of a mild disposition, was very liberal, and protected the people of the country, as if they were his children; he gave presents of cows, horses, and deer skins, and constructed the two towns called *Lacshmisarana puram*, and *Jaganad'ha puram*. He gave a donation, recorded by an inscription, at *Vasudeva puram*, and gave many *Saligrammas* (stones sacred to *Vishnu*) to the *Brahmans*. He also re-constructed the town and fort of Goomsoor.

He built some fanes of stone masonry, and had the image of *Vasudeva-svami* consecrated, as also the images of *Capilèsvara-svami* and *Jaganad'ha svami*, and from morning to night was engaged in hearing the *puranas* read to him. He was accustomed to invite poets from various places, giving them presents on dismissal. He also gave to me two books the *Satya-parvam* and *Adiparvam* containing a poetical account of his ancestry with instructions to put the contents into metre adapted to singing. I did according to his desire. My name is *Rama Chandra paramá guru.* This *Lacshmana B'honju* ruled eight years, having been daily accustomed to eat *Vasa Nabhi* (*Acorus calamus*), he one day took rather more than the customary quantity and going out afterwards in the heat of the day, it took powerful effect on him, and he died. After him his son named *Sri-cara B'honju,* being in *Asica* (name of a place) acquired the favor of the British, and was installed. He protected the people like children ; built the porch named *Ramá svami* of *Nettango*; protected the divine *Brahmans*; heard the stories of the *puranas* recited ; and, being well skilled in all kinds of knowledge, he ruled six years. He then adopted the *Vedanta* system, and renouncing the world, gave the rule to his son *D'hanur-jaya B'honju,* put on the *Sanniyasi* habit ; and, going on pilgrimage, became a *Bairagi* for three years ; at the end of which period coming back, and inspecting the state of the country, he found that his son *D'hanur-jaya B'honju* had maltreated the people, and, through not paying the tribute to the Sircar, he had become afraid, and had fled to the country of the *Nuvagada raja. Sri-cara B'honju* after taking the charge on himself, conducted himself disorderly ; did not pay tribute for five years ; and, associating with some zemindars, he rebelled, so that the *Sircar* recalling *D'hanurjaya B'honju* gave him some troops, and driving away *Sri-cara B'honju* re-instated *D'hànarjaya B'honju* (the Company being unable to bear with his bad conduct during twelve years rule assumed the country for five years). Subsequently the *Sircar* appointed a woman named *Balab'hadra B'honju* to the government. *Sri-cara B'honju,* who had been in prison hearing that a woman governed, entered the country in a private manner, made the British government acquainted with this circumstance ; and, gaining their favor, they restored to him the country. While ruling he conducted himself as a *raja rishi* (kingly ascetic) having no wife or family whatsoever, and protected the people like children. He expended much money in building a tower to the fane of *Surya Narrayana-svami* of *Buguda,* and a tower to the fane of *Jaganad'ha svami,* having them both dedi-

cated. He built a fane to *Narrayana-svami*, in *Vishnu chacra* (fort); and had the image made sacred. He restored and repaired many decayed *Saiva* fanes. He also had many reservoirs dug and groves planted; he acquired fame, made great presents and regularly paid his tribute to the *Sircar* without balance left. A war falling out between himself and the *Nuvagada* chief, he conquered; and took back two villages called *Asalu* and *Cassalu*, which they had wrested from him. In consequence of the war he fell into arrears of tribute, and owed fourteen years payment. The *Sircar* in consequence recalled *D'hanur B'honju* and gave him the country; while *Sri-cara B'honju* was detained at *Jaggernaut*. Afterwards *D'hanur B'honju* for three years did not pay tribute, and after opposing the Company, he died in Malwa.

As the narrative of the race of *Ranam B'honju*, has its origin in the *Mahab'harata*, it follows that all who read or hear it will thence derive great benefit.

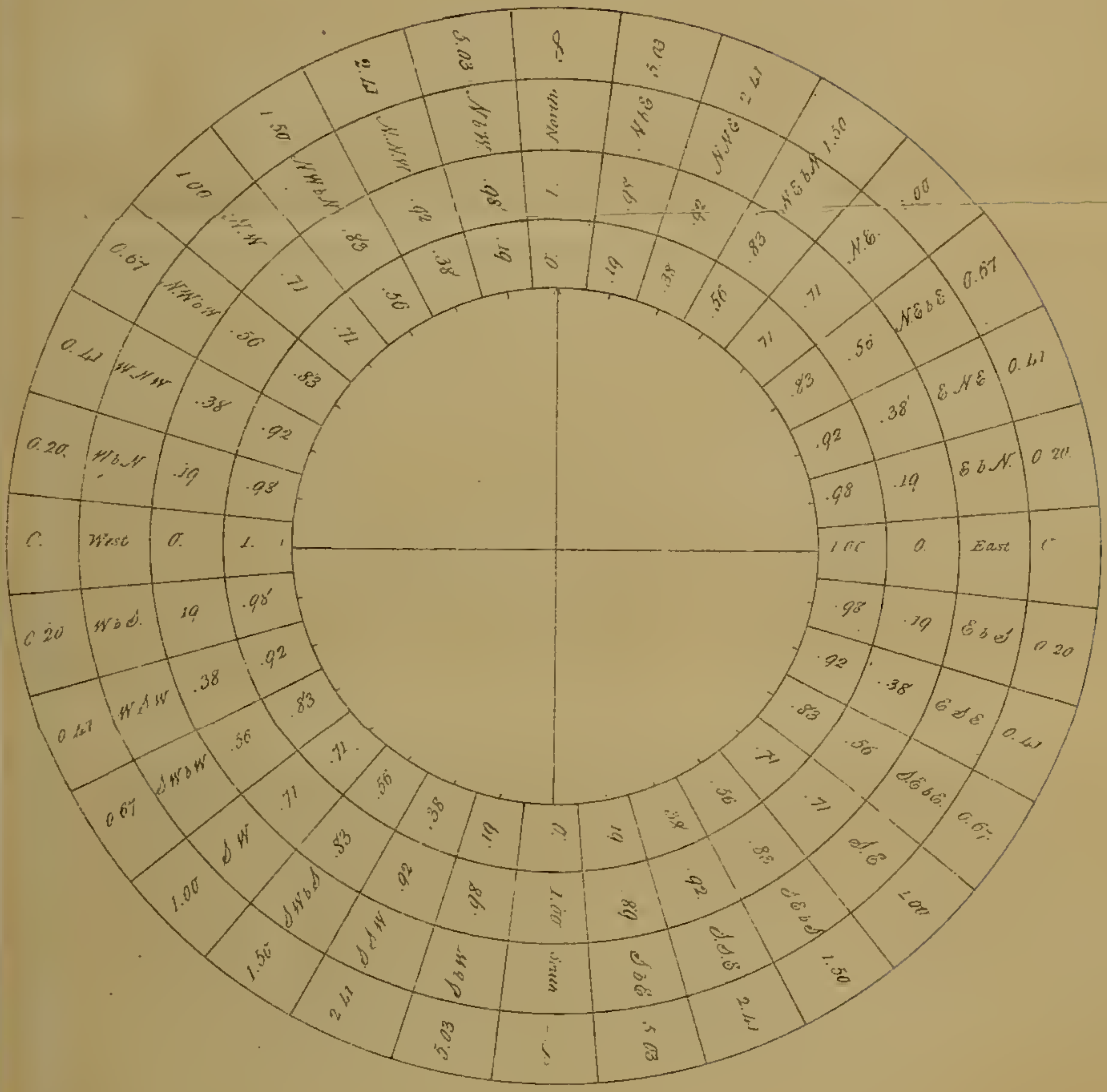
Crishna B'hotlu of *Asica Siddhanti* wrote the foregoing account, from the poetical narrative by *Rama Chandra Gura* in the Odra (or Orissa) language.

V.—*On the deduction of a Mean Result from a Numerical Register of the Direction of the Wind.—By* JAMES DALMAHOY, *Esq. of the Madras Medical Establishment.*

With the view of recording numerically the direction of the wind, and of obtaining the mean result of a series of observations, Lambert divided the horizon into 360°, and placed zero of the scale at the south, 90° at the west, 180° at the north, &c.* The brief account of Lambert's method in the accompanying note, does not allude to the mode of deduciug a mean result, but it seems evidently implied that he regarded the direction denoted by the arithmetical mean of the numbers

* The following quotation is from Professor Forbes' Report on Meteorology. "Of all the columns of that too often unprofitable work, a meteorological diary, one of the most profitless has generally been that devoted to the direction of the wind, as, in its usual form, it does not admit of having any average taken, and therefore remains an undigested mass of insulated observations. In order to draw any useful conclusion from this observation, we would therefore recommend the adoption of Lambert's numerical form, in which the south is denoted by 0', and the angle is measured round the horizon by the W., N. and E. In this way S. W. is denoted by 45°, W. by 90°, &c.—*Reports of the British Association*, vol. 1, p. 249.

Dial of the Anemoscope.



corresponding to any series of directions, as the mean direction of the series; for example, $\frac{90^\circ + 135^\circ + 180^\circ + 225^\circ}{4} = 157^\circ.5$, corresponding to N. N. W., as the mean direction of W., N. W., N., N. E.

But since, in the above division of the horizon, the position of zero is altogether arbitrary, any change in its position ought not to affect the mean result deducible from a given set of observations. It however admits of proof that if zero of the scale be supposed to move, from south towards west, round the whole horizon, as soon as it reaches the point corresponding to the first of a series of observations, the mean result begins to vary, and continues to do so until, after a complete revolution, the scale again commences at the south. Consequently, Lambert's mode of deducing the mean direction of the wind is indeterminate, and furnishes only one of many possible results.

It may also be observed that the horizon being divided into 360°, the arithmetical mean of the numbers denoting any two opposite points of the compass is never less than 90° nor greater than 270°; and hence that the method in question not only assigns a mean to two exactly opposite directions of the wind, which is absurd, but likewise invariably refers it to the northern half of the compass.

The object of the remainder of this short paper is to propose a mode of avoiding these defects, by determining the mean direction of the wind in a different manner.

The accompanying circular figure (*see plate*), may be supposed to represent the dial of an Anemoscope. The circumference of the innermost circle is divided into thirty-two points, a division which appears sufficiently minute for meteorological purposes, without being extended to quarters of points. The different points of the circumference are referred to two rectangular axes having their origin at the centre: of these the line joining the north and south points is the axis of ordinates, and that joining the east and west points is the axis of abscissas. The arithmetical values of the co-ordinates of each point, affected with their proper signs, are laid down opposite to it, the abscissa occupying the first space from the centre, and the ordinate the second. The third space contains the letters by which the point is distinguished; and the fourth its tangent, or rather that of the arc intercepted between it and the east point. The arithmetical values of these lines are assigned with reference to radius = 1.

If now a series of directions of the wind be denoted by their corresponding points on the circumference, and the arithmetical mean, first

of the ordinates, and then of the abscissas of these points be found, the former will be the ordinate and the latter the abscissa of the point, the position of which is the mean of the positions of the given points. Further, if the ordinate be divided by the abscissa of the mean point, or, which is the same thing, if the sum of the ordinates be divided by the sum of the abscissas of the given points, the quotient will be the tangent corresponding to the point in which a line, drawn from the centre through the mean point, meets the circumference. Finally, the direction denoted by the point thus found, is that which it is proposed to regard as the mean of the given series of directions of the wind.

The form of register adapted to this mode of determining the mean direction of the wind, consists of two columns, one of which, for the sake of distinction, may be marked x and the other y. In the former of these the abscissa of the point from which the wind blows is to be entered, and in the latter the ordinate. In order to obtain the mean result of any series of observations, the sum of the terms in column y is to be divided by the sum in column x; the quotient gives the tangent corresponding to the required point, and thence the point itself, by mere inspection of the anemoscope. The particular quadrant to which the tangent belongs is indicated by the signs of the two quantities from which it is derived.

Of the two modes of determining the mean direction of the wind which have been described, the latter seems to have the advantage in the following particulars.

1st. It is determinate, only one definite mean result being obtainable from a given set of observations.

2d. It assigns as the mean direction of the wind, one which lies between, and in the same half of the compass with, its most prevalent directions.

3d. When there are two exactly opposite directions of the wind, the two points which, in other cases, serve to determine the mean direction, coincide, rendering the result indeterminate, as it ought to be.

In the accompanying table, containing the evening observations of the wind made at the Madras Observatory in August and September 1836,* the different forms of register are contrasted. The series for September has been selected, for the purpose of shewing that Lambert's register sometimes assigns, as the mean direction, one the remotest possible from the prevalent directions of the wind.

* These observations are to be found in the Madras Journal of Science and Literature, No. 13.

In conclusion it may be observed that, as the mode which has been proposed of determining the mean direction of the wind corresponds exactly with that of finding the direction of the resultant of a series of *equal* forces acting simultaneously, it is evident that, if necessary, the force might be recorded along with the direction of the wind, and the direction and intensity of the resulting force be determined.

TABLE SHEWING THE APPLICATION OF THE DIFFERENT FORMS OF REGISTER TO TWO SERIES OF OBSERVATIONS.

August 1836.	Present form of Register.	Lambert's form of Register.	Proposed form of Register. *x*	Proposed form of Register. *y*		Sept. 1836.	Present form of Register.	Lambert's form of Register.	Proposed form of Register. *x*	Proposed form of Register. *y*
1	W.	90	—1.	0		1	N. E.	225	.71	.71
2	E.	270	1.	0		2	N. E.	225	.71	.71
3	SEbyS.	362	.56	—.83		3	S.	0	0	—1.
4	S. E.	3 5	.71	—.71		4	S. S. W	23	—.38	—.92
5	S. W.	45	.71	—.71		5	S.	0	0	—1.
6	S. W.	45	.71	— 71		6	S. E.	315	.71	—.71
7	S. W.	45	.71	—.71		7	S. E.	315	.71	—.71
8	W.	90	—1.	0		8	S. E.	315	.71	—.71
9	W.	90	—1.	0		9	SEbyE	304	.83	—.56
10	S. W.	45	.71	—.71		10	E.	270	1.	0
11	S. W.	45	.71	—.71		11	S.	0	0	—1.
12	S. W.	45	.71	—.71		12	S.	0	0	—1.
13	S. W.	45	.71	—.71		13	S.	0	0	—1.
14	S.	0	0	—1.		14	S. E.	315	.71	—.71
15	S.	0	0	—1.		15	S. E.	315	.71	—.71
16	S E.	315	.71	— 71		16	E.	270	1.	0
17	S.	0	0	—1.		17	N. W.	135	—.71	.71
18	S.	0	0	—1.		18	N. W.	135	—.71	.71
19	S.	0	0	—1.		19	S.	0	0	—1.
20	S. W.	45	—.71	—.71		20	S.	0	0	—1.
21	S. W.	45	—.71	—.71		21	S.	0	0	—1.
22	S.	0	0	—1.		22	S. E.	315	.71	—.71
23	S.	0	0	—1.		23	S.	0	0	—1.
24	W.S.W.	68	—.92	—.38		24	S. W.	45	—.71	—.71
25	S.	0	0	—1.		25	S. W.	45	—.71	—.71
26	S.	0	0	—1.		26	E.	270	1.	0
27	SEbyS.	326	.56	—.83		27	N.	180	0	1
28	S. E.	315	.71	—.71		28	S. W.	45	—.71	—.71
29	SEbyS.	326	.56	—.83		29	E.	270	1.	0
30	S. E.	315	.71	—.71		30	S. E.	315	.71	—.71
31	NWbW	121	—.83	—.56						
		3411°	--5.62	--20.54	Sum of each col.			4747°	7.29	—13.74
		110°	3.65		Num. mean result			158°	1.88	
		W.N.W. ¼W	S. by W. ½ W.		Mean result expressed in letters.			N.N.W.	S. S. E. ½ E.	

VI.—*On the Rate of a Clock with a Wooden Pendulum; and on the longitudinal Expansion and Contraction of Wood.*—*By* Lieutenant BRADDOCK.

1.—Being in the practice of amusing myself during leisure hours in experimental and philosophical pursuits, I took a fancy, about a year ago, to make up an astronomical clock, intending it to be a correct time-keeper, if I could but command sufficient dexterity and skill in the mechanical department to make the parts of the clock work smoothly, and to finish them in an efficient manner. Having an engine for cutting the teeth of wheels, which I constructed some years ago, a small turning lathe, and other necessary tools and implements, I commenced operations, and being a tolerable amateur workman found no difficulty in finishing an 8-day clock, with Graham's dead-beat escapement and a pendulum vibrating seconds.

2.—A compensating pendulum being a tedious thing to make, and to adjust to mean time, I made enquiries and read all I could find about pendulums with wooden rods, and ascertaining that a piece of clean grained dry fir, or deal, made a very capital substitute for the more complex metallic compensating pendulum, I adopted it for my clock; and have the pleasure to send you its rate of going, with a few remarks, and some experiments on the longitudinal contraction and expansion of wood.

3.—I was somewhat perplexed at the outset by contradictory opinions regarding the propriety of varnishing, or not varnishing, the pendulum rod; some writers considering it necessary, and others not. I adopted however the opinion of the former, thinking that the wood would be less pervious to humidity, and consequently be less affected by changes of the atmosphere, if it was well coated with varnish; but at the same time I fitted up an apparatus, hereafter described, with a micrometer, in order to ascertain whether well seasoned wood did change its length from hygrometric causes. I have reason to conclude, from the experiments I have made, that it does, and that to too considerable an extent in this part of India, to prevent its successful use for the particular purpose now under notice.

4.—In order to remove doubt with reference to those who may take an interest in such enquiries as the present, it is necessary to state that the wood, employed for the pendulum rod, was clean grained American

fir, for which I sent to London some years ago, for the purpose of making barrels for a small self-performing organ; a purpose which required pine or fir of good quality. It had been freely exposed to the air in the verandah of a bungalow for four or five years, and I have reason to think that it was pretty well seasoned, as the land winds for five successive seasons had blown freely upon it.

5.—Nothing in the arrangement or construction of the clock was new, so as to call for particular notice; the second and hour hands had small subordinate dials to themselves, and the minute hand swept round the large dial, or face of the clock. The pendulum bob was of lead and weighed 12-lbs. avoirdupoise; the going weight of the clock was 5-lbs., and the swing of the pendulum kept steadily within from 2° 0′ to 2° 3′ or 2° 4′, on each side the centre of the arc of vibration. As the firm suspension of the pendulum is however an important part in the putting up of a correct time-piece, I may mention the manner in which I effected this point. The clock-case had for its back-board, a fine solid plank of teak, 18 inches wide, and one and a half inch thick. The sides of the clock-case were glued and screwed to this plank, so that the whole was very substantial. The plank was secured by bolts to the wall of the room in which the clock was placed. A block of wood about six or seven inches long, and an inch and a half thick, was glued and screwed with six strong 3-inch screws to the back plank, at the proper height for suspending the pendulum, which was supported from this block by two screws that, passing through it from the top, were tapped into the brass beneath (Pl. C, fig. 1), which will shew at a glance how the pendulum was suspended; and though the mode was simple I found it very secure.

6.—The following table shews the mean-time rate of the going of the clock, in seconds and tenths of seconds daily. The asterisks are intended to denote the days on which observations were taken. The observations consisted simply in taking the time of the clock at evening gun-fire,—gun-fire time being taken also at the Madras Observatory, and then obtaining the mean time of gun-fire from the Observatory, and reducing the rate of the clock from it.

DAILY RATE IN SECONDS AND TENTHS OF SECONDS OF THE GOING

JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.	
			′ ″		′ ″		′ ″				′ ″
1		1	+3.5*	1	−1.0*	1	−1.4*	1		1	−0.5
2		2	3.0*	2	1.0	2	1.4	2		2	0.5*
3		3	5.0*	3	0.5*	3	1 4	3		3	+0.5
4		4	4.0*	4	0.5	4	1.4	4		4	0.5
5		5	4.0*	5	0.8*	5	1.4*	5		5	0.5*
6		6	2.5*	6	0.8	6	1.8	6		6	0.7
7		7	Regd.	7	0.8	7	1.8	7		7	0.7
8		8×	2.0*	8	0.8	8	1.8*	8		8	0.7*
9		9	2.0	9	0·5*	9	0.7	9		9	3.0
10		10	1.0*	10	0.5	10	0.7	10	′ ″	10	3.0
11		11	1.0	11	0.5	11	0.7*	11	−0.3*	11	3.0
12		12	0.0	12	0.5	12	2.3	12	0.3	12	3.0
13		13	0.0*	13	0.5	13	2.3	13	0.3	13	3.0*
14		14	−0.7	14	0.5	14	2.3	14	0.3*	14	3.7
15		15	0.7	15	0.3*	15	2.3	15	0.2	15	3.7
16		16	0.7	16	0.3	16	2.3*	16	0.2	16	3 7
17		17	0.7	17	0.3	17	6.0*	17	0.2*	17	3.7
18		18	0.7	18	0.3	18	2.0*	18	0.3	18	3.7
19		19	0.7	19	0.3*	19	11.2	19	0.3*	19	3.7*
20		20	0.7	20	0.3	20	11.2	20	0.3	20	5.2
21		21	0.7	21	0.3*	21	11.2*	21	0.3	21	5.2
22		22	0.7	22	0.2	22	23.0	22	0.3*	22	5.2
23	′ ″	23	0.7	23	0.2	23	23.0*	23	0.2	23	5.2
24	+2.5*	24	0.7	24	0.2	24	25.0	24	0.2*	24	5.2
25	2.5*	25	0.7*	25	0.2	25	25.0	25	0.3	25	5.2
26	3.5*	26	0.5	26	0.0*	26	25.0*	26	0.3	26	5.2
27	4.0*	27	0.5	27	0.0	27		27	0.3*	27	5.2
28	4.0*	28	0.5	28	0.0	28		28	0.5	28	5.2
29	3.5*			29	0.0	29		29	0.5	29	5.2
30	3.5*			30	0.0	30		30	0.5	30	5.2*
31	3.5*			31	0.0			31	0.5*		

The asterisks denote the days on

OF A CLOCK WITH A WOODEN PENDULUM, MADRAS, 1837.

JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″
1	+5.1*	1	—1.5*	1	+4.0*	1	+0.2*	1	+0.0*	1	—[illegible].0*
2	5.1	2	1.5	2	4.0	2	0.2	2	0.0	2	2.0
3	5.1	3	1.5	3	4.0	3	0.2	3	0.0	3	2.0
4	5.2*	4	1.5	4	4.0	4	0.2	4	0.0	4	2.0
5	5.2	5	1.5	5	5.7*	5	0.2	5	0.0	5	2.0
6	5.2	6	3.0*	6	5.7	6	0.2	6	0.0	6	2.0
7	5.2	7	3.0	7	5.7	7	1.3*	7	0.0	7	2.0
8	5.2	8	3.0	8	5.7	8	1.3	8	—3.0*	8	2.0*
9	5.2	9	3.0	9	5.7	9	1.3	9	3.0	9	3.0
10	5.2	10	1.0*	10	5.7	10	1.6*	10	3.0	10	3.0
11	5.2	11	1.0	11	5.7	11	1.6	11	3.0	11	3.0
12	5.2	12	1.0	12	4.4*	12	1.6	12	3.0	12	3.0
13	5.2	13	1.0	13	4.4	13	1.6	13	3.0*	13	3.0
14	5.2	14	1.0	14	4.4	14	1.6	14	3.0	14	3.0
15	5.2	15	+0.3*	15	4.4	15	1.6	15	3.0	15	3.0
16	5.2	16	0.3	16	4.4	16	1.6	16	3.0*	16	3.0*
17	5.2	17	0.3	17	4.4	17	1.6	17	3.0	17	3.5
18	5.2	18	0.3	18	4.4	18	1.6	18	3.0	18	3.5*
19	5.2	19	0.3	19	4.4	19	2.5*	19	4 0	19	
20	5.2	20	0.3	20	4.0*	20	2.5	20	4.0*	20	
21	5.2	21	0.3	21	4.0	21	2.5	21	3.5	21	
22	5.2	22	4.0*	22	4.0	22	2.0*	22	3.5	22	
23	5.3*	23	4.0	23	4.0	23	2.0	23	3.5	23	
24	5.3	24	4.0	24	3.0*	24	2.0	24	3.5	24	
25	5.3	25	4.0	25	3.0	25	2.0	25	3.5*	25	
26	5.3	26	4.0	26	3.0	26	1.5*	26	3.0	26	
27	5.3	27	4.0	27	4.6*	27	1.5	27	3.0	27	
28	5.3	28	4.0	28	4.6	28	1.5	28	3.0	28	
29	5.0*	29	4.0	29	4.6	29	0.0*	29	3.0	29	
30	5.0	30	4.0	30	4.6	30	0.0	30	3.0	30	
31	5.0	31	4.0			31	0.0			31	

which observations were taken.

7.—From the rate of going which this table exhibits from January to the end of March, it may be inferred that the clock movements and working parts were well made, but in the month of April the clock ran wild. On taking it down I discovered that one of the pallets, which were of steel and were screwed on to the arms of the escapement, had got loose; I made both pallets firm and tight, and put up the clock again; and its rate of going for the month of May, it will be seen, was beautiful. On the first of June the land winds set in, and the effect was soon felt by the clock, which began rapidly to change its rate of going from minus 0' 5" daily, to plus 0' 5"; 0' 7";—3' 0", and 5' 2".—Finding that the hot dry winds had so great an effect on the pendulum, I paid little attention to the clock afterwards, but let it go on until I should see what effect the damp weather of the monsoon would produce. In the beginning of November a great deal of rain fell, and as might be expected the rate of the clock changed again, from gaining to losing, thereby clearly shewing that the wood I employed for the pendulum, though well varnished, and I think well seasoned, was so much affected by the hygrometric changes of the atmosphere as to render it unfit for the pendulum rod of a correct time-keeper.

8.—There appears to be some doubt, as well as difference of opinion, as to the successful use of a wooden rod pendulum; some thinking it nearly as good as the compensating pendulum, and others putting no faith in it. The experiment I have made will determine the point only as far as the particular specimen of wood I employed was concerned, and no further. But, as being closely connected with the subject, I subjoin some experiments on the longitudinal expansion and contraction of wood, occasioned by changes in the atmosphere, which changes, with respect to temperature, alter the rate of a clock's going, when a common metallic pendulum is attached to it, and with respect to dryness or humidity, chiefly, when the clock is supplied with a wooden pendulum. The specimens were as follows: viz.

No. 1.—Dry well-seasoned teak.

2. A very hard wood, called by the Malabar workmen பால்மரம் Päl Márám, or milk wood.

3. Dry well-seasoned chittagong wood.

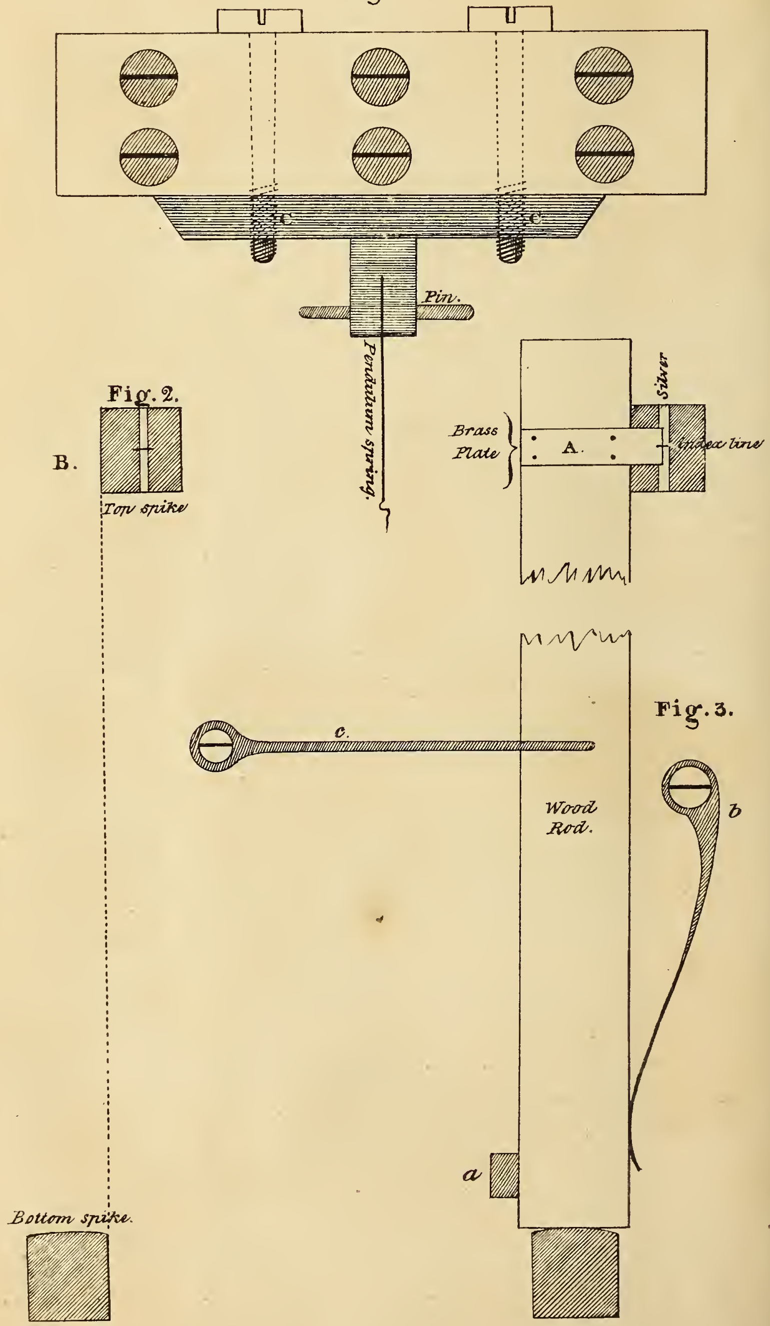
4. Mahogany, from a clock-case: had been at Madras for half a century.

5.* American pine or fir had been at Madras 4 or 5 years.

6.* The same varnished.

* Both these were twin pieces from the same piece of fir that the clock pendulum was made of.

Fig. 1.



C
C
Pin.
Pendulum spring.
Fig. 2.
B.
Top spike
Silver
Brass
Plate
A.
Index line
Fig. 3.
c.
Wood
Rod.
b
a
Bottom spike.

9.—The whole of these woods were straight grained, and free from curls or knots; they were planed up in slips or rods one inch wide and two-tenths of an inch thick: and were cut to the length of three feet one inch, having a piece of brass for an index rivetted on them, distant three feet from one end.

10.—The following account will explain the method I adopted to ascertain the variation of length in these rods occasioned by the hygrometric changes of the atmosphere.

11.—I drove into the interior wall of a dry, well sheltered bungalow two stout iron spikes about three feet apart; the bottom spike had its upper surface slightly rounded, and the top spike had a slit cut in it, and a piece of silver inserted, as shewn at B, figure 2, and across the slip of silver an index line, or mark, was made at exactly three feet distance from the surface of the lower spike. The brass plates on the rods, as shewn at A, fig. 3, had index lines made on them at the outset of the experiment, exactly corresponding with the distance from the surface of the bottom spike to the line on the silver in the top spike; that is, each rod was placed in position, and a fine line was then made on the brass, and the length of the rod was adjusted till the line exactly coincided with the index line on the silver. A stop and spring, *a*, *b*, fig. 3, were fixed near the lower spike, in order to ensure the rods always fitting exactly in the same place, and another spring *c* pressed upon the face of the rod to keep it flat against the wall, which was a perfectly plane surface: for in reading off micrometrical measurements to a minute fraction of an inch, some care and nicety are necessary.

12.—It is only requisite to add in further describing the apparatus employed, that a micrometer was fixed over the upper spike so as to read off any variation that might occur between the lines made respectively on the brass plates fixed on the rods, and the immoveable index line upon the silver. One division on the head of the micrometer screw read off to $\frac{1}{6350}$ part of an inch, and the error of the screw in twenty-five full revolutions of the micrometer head did not exceed the $\frac{1}{10,000}$ part of an inch. The readings therefore may be depended on with safety to the $\frac{1}{5000}$ part of an inch, which is greater accuracy than I required for the purpose I had in view. The wall of the bungalow being quite dry and well sheltered, I should apprehend that the quantity of its expansion or contraction from the humidity or the dryness of the atmosphere, would not be sufficient to interfere with the result of these experiments; however if it be thought that some allowance should be

made on that account, such allowance as the reader may think necessary can be made accordingly.

13.—The respective rods being conveniently suspended close by the apparatus, and subject to the free air that circulated in the bungalow but shielded from the weather, the following table exhibits the results of the first experiment on their lengths: the rods being all unvarnished except No. 6, which was covered with 3 coats of spirit varnish. The mark +, plus, signifies that the rod, on being tried, had elongated; the mark —, minus, signifies that it had contracted: the figures denote the decimal parts of an inch of the expansion or contraction of each rod respectively.

1837.	February.	Rod No. 1 Teak.	Rod No. 2 Pal maram.	Rod No. 3 Chittagong.	Rod No. 4 Mahogany.	Rod No. 5 Fir.	Rod No. 6 Fir.	HairHygro.	Ther.
9		0.0	0.0	0.0	0.0	0.0			
10	Even.	—0.0011	—0.0014	—0.0030	—0.0016	—0.0019		73	82
11	Morn.	0.0	0.0	—0.0011	0.0	+0.0009		81	78
	Even.	—0.0038	—0.0042	—0.0061	—0.0045	—0.0073		66	82
12	Morn.	+0.0003	+0.0006	0.0	+0.0008	+0.0027	+0.0013	82	78
	Even.	—0.0012	—0.0016	—0.0034	—0.0016	—0.0022	0.0011	73	83
13	Morn.	+0.0009	+0.0016	0.0	+0.0011	+0.0025	0.0036	81	80
	Even.	—0.0017	—0.0017	—0.0036	—0.0022	—0.0034	0.0009	72	83
14	Morn.	+0.0014	+0.0014	—0.0003	+0.0014	+0.0025	0.0040	81	81
26	Even.	—0.0019	—0.0019	—0.0031	—0.0022	—0.0027	—0.0003	73	87
27	Morn.	—0.0005	—0.0003	—0.0011	—0.0006	+0.0008	+0.0011	79	78

14.—These few experiments made it evident that plain wood, not having been subject to artificial preparation, would lengthen and contract so much as to cause a clock with a pendulum made of either of these specimens to keep very uncertain time. With a view therefore to ascertain whether any advantage would be derived from artificial means, I took the same rods, coated them over with a layer of resin, white candle wax, and linseed oil, having first melted and mixed these substances together over a fire, and with a brush laid the mixture on the rods while it was quite hot. The wood at first absorbed this hot waxy and resinous mixture, but by applying two or three coats, the rods became saturated, and when it cooled the wood was thickly coated with it. I then held the rods over a charcoal fire, and broiled the mixture well into them, and when it disappeared, I laid on another coat of it, and rubbed it well into the rods with a cloth. After this, I painted the rods over again with the mixture, and again exposed them to the fire,

so that I thought I had eventually quite filled up the pores of the wood, and made the rods, so far, impervious to moisture. As a further step in the experiment I then varnished three of the rods, viz. Nos. 1, 4, and 6; the teak, mahogany, and fir; laying on each three coats of spirit varnish. It may be here observed that the fir rod No. 6 was now doubly varnished, viz. varnished in the first experiment, then coated with the foregoing mixture, and afterwards varnished again. On trying the length of the rods after this process had been gone through, I found that the whole of them had contracted considerably, but the mahogany the most of all, notwithstanding it was so perfectly well seasoned. The following table will shew the respective contractions, from the original lengths.

No. 1.	Teak	(coated with hot resin, wax, &c. and spirit varnish) contraction..	0.0070
2.	Pal maram	do. (wax, resin, &c. but not varnished) do....	0.0149
3.	Chittagong	(do. do.) do....	0.0108
4.	Mahogany	(do. and spirit varnish) do....	0.0256
5.	Fir	(do. not varnished) do....	0.0115
6.	Fir	(do. and spirit varnish) do....	0.0083

15.—This diminution in the length of the rods was not permanent. The whole of them went on gradually increasing in length from the beginning of March 1837, when the foregoing experiment was made, until the 16th August following, when it appeared that the Chittagong rod, and the two fir rods, the softest woods, had fully recovered their original lengths and a little more; but the others had not. The following was the state of the rods on the foregoing date, viz. 16th August.

No. 1.	Teak	minus	0.0020	of an inch.
2.	Pal maram	do.	0.0068	„
3.	Chittagong	plus	0.0003	„
4.	Mahogany	minus	0.0176	„
5.	Fir	plus	0.0006	„
6.	Fir	do.	0.0006	„

16.—In November they had all recovered their original lengths, except the mahogany, which, up to the present date, seems to have undergone a permanent contraction. The undermentioned table will shew their lengths as ascertained on several occasions in November and December 1837.

		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
November	5	+0.0070	+0.0008	+0.0060	−0.0116	+0.0107	+0.0089
	12	0.0069	0.0	0.0036	0.0102	0.0085	0.0092
	20	0.0078	+0.0005	0.0042	0.0096	0.0101	0.0103
	26	0.0069	−0.0017	0.0027	0.0104	0.0077	0.0092
December	1	0.0039	0.0047	0.0009	0.0122	0.0042	0.0070
	6	0.0052	0.0020	0.0034	0.0113	0.0083	0.0083

17.—The month of November was extremely damp from the copiousness of the monsoon, during which the whole of the rods attained their greatest length, and on the 20th of that month, the mahogany rod was longer than before or after, but it seems to have suffered a permanent contraction of about one-hundreth part of an inch. As far as these experiments go, it would seem that varnishing wood does not prevent its being affected by humidity, and that its variations of length, from the hygrometric state of the atmosphere, are so considerable, as to render it unfit, at least at Madras, for being employed in the construction of a pendulum for a correct time-piece. This is evidently the case with the specimens under notice, but it would not be proper to assert that all kinds of wood, however prepared, would also be unfit, for I have heard it said that a clock with a wooden pendulum has been known in London to keep perfect time. There is one advantage that a clock in England has over clocks in this country; they are not so much subject to the free action of the atmosphere; the free air is shut out in England by glass windows, while in this country it blows through our houses freely, moist or dry, all the year round. This circumstance makes a great difference, when it is known that only the thousandth part of an inch in the length of a pendulum vibrating seconds, will throw the clock out of mean time, one second in 24 hours; and the thousandth part of an inch is but a fine line.

18.—One very useful hint to the meteorologist may be gathered from these experiments;—they shew that perfectly well seasoned mahogany, varnished, or not varnished, varies considerably in length according to the state of the atmosphere. Both mountain, and other very good barometers are fitted up in wood, and to the wood, which is generally mahogany, the scale of inches is affixed. Mountain barometers read off to the 0.001 (the thousandth part) of an inch, which is a minute quantity; but it is extremely probable that such minuteness is in practice, not a real but a fictitious degree of accuracy; for the expansion and contraction of the wood, in dry or wet weather, will amount to

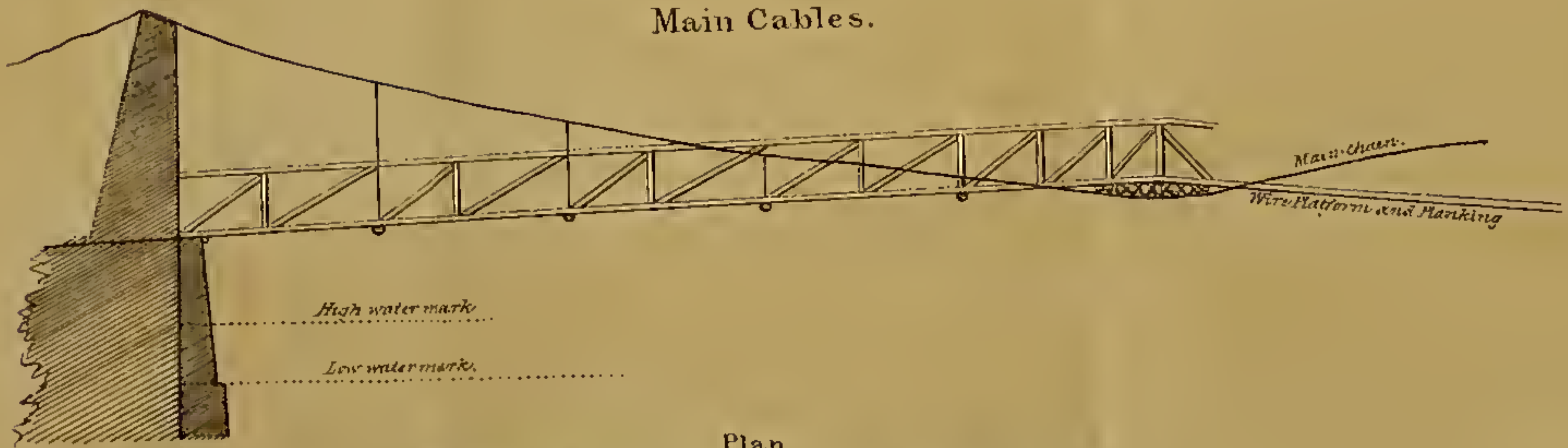
View of the half Bridge

shewing the method of supporting the middle of the

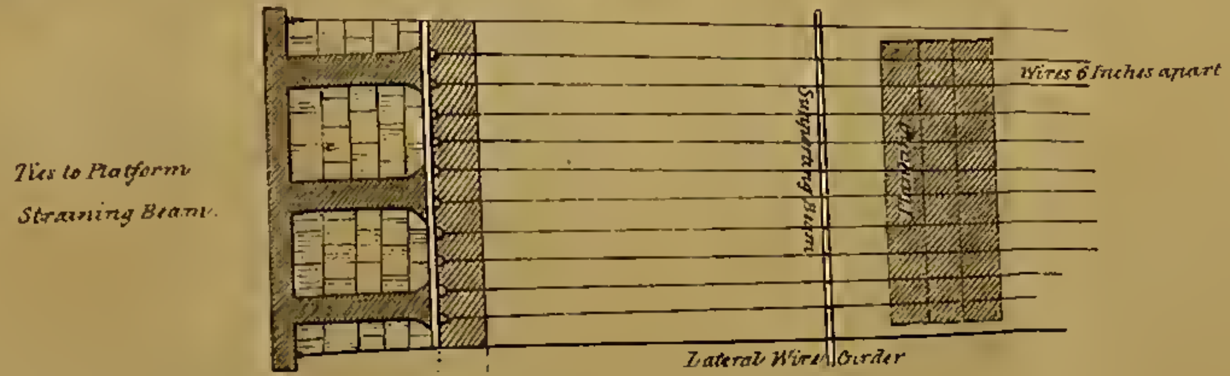
WIRE PLATFORM

on the

Main Cables.



Plan.



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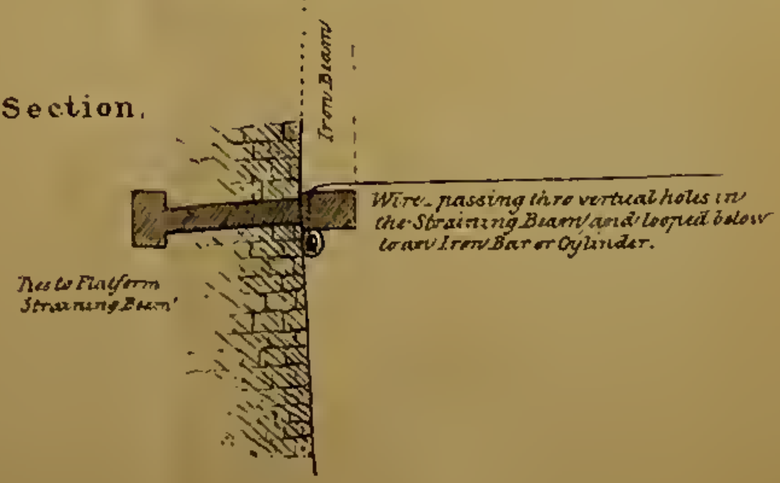


much more than the thousandth part of an inch. In the first trials with the mahogany rod before it was varnished, the mere change in the hygrometric state of the air, in the morning and evening, in fine weather, caused a difference on the 11th February, as the foregoing experiments shew, of more than four times that quantity; making it 0.0045 longer in the evening than it was in the morning. The fact is worth remembering, as it may bear on other points besides the reading off the height of a barometer. And I am not certain whether it is generally known that mahogany and fir are so much affected by the state of the atmosphere, as the foregoing experiments shew them to be.

21*st December* 1837.

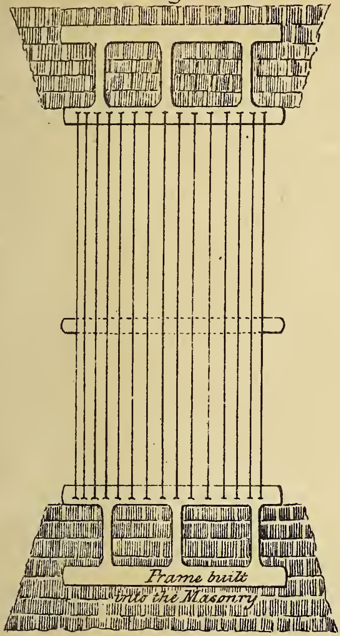
VII.—*On the Construction of Suspension Bridges, and the Materials best suited for them in this Country*—By Captain GEORGE UNDERWOOD, *of the Madras Engineers.*

My attention having been recently much called to the subject of suspension bridges, and to the difficulty of properly manufacturing iron bars, in places far away from large towns, or indeed in any part of Southern India, I was induced to enter into a careful examination of the merits of iron wire, and feel confident that this material may be more extensively used in this country than I had anticipated. The famous suspension bridge of Fribourg, in Switzerland, 875 feet span, the largest in Europe, being 300 feet longer than that of the Menai, has wire of about 1-10th of an inch diameter to form its suspending cables, and the method adopted by the able engineer who erected it, is simple, and highly encouraging to those who may wish to follow his example (vide Penny Magazine for August 1836, No. 279*). One of the greatest difficulties to be overcome in suspension bridges, is, the dangerous effect of vibration, and the force that the suspended mass will acquire by being put in motion, increases rapidly. Mr. Drewry, in his valuable work on suspension bridges, remarks, " Hence it is an object " to make it resist motion, and especially to make every part bear its " fair share of strain. It is a common doctrine that lightness is the " peculiar excellence of a suspension bridge, but that is a principle " which must be acted upon with discretion, and not taken generally.

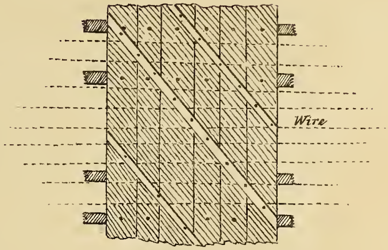
* Saturday Magazine for November 1835, No. 219.

" For a bridge may be, from its size, just so heavy, that by being put " in motion it will acquire great *momentum*, and just so light, and slight, " that it will be unable to resist the effects of its own vibration. " Therefore, when it becomes necessary to make the chains of a bridge " so heavy that vibration would be dangerous, it is advisable boldly to " increase their weight, rather than attempt to diminish it, and to " *bind and connect the several chains and the road-way firmly together*, " in order that there may be sufficient MASS and stiffness in the bridge " to resist motion, rather than yield to it readily." The Dryburgh bridge, across the Tweed, was entirely ruined by violent vibration during a storm, but it was of a very faulty construction, and by no means so well adapted to resist motion as those now in use. It is needless to observe, that the greater the weight suspended between the piers, the greater the cost, and (vibration apart), the greater the risk. Under these circumstances therefore, I venture, with diffidence, to suggest a mode of forming the platforms of suspension bridges, which shall not only prevent all motion in the chains, but reduce the cost, while, at the same time heavy wooden joists are avoided ; and, of perishable material, a little planking only made use of. My plan is this (*Pl. fig.* 1) :—Having fixed strong iron beams horizontally to each basement of the suspending piers, *transversely* at the level of the roadway, iron wires are to be slightly stretched from the one to the other of these straining beams, in parallel lines. The number of these bands, and whether composed of one or more wires each, must of course depend on the load of planking and other weight, to be allowed on the bridge. A temporary beam, placed under the middle of this wire platform, will now be drawn up by tackle fastened to a frame resting on the suspending chains, to a height sufficient to admit of the insertion *transversely* of a strong hollow cylinder of iron, *below* the wires, and upon the chains. Thus the wire platform will be strained (but not too strongly) into a curve upwards (*Pl. fig* 2), forming any desired slope for the roadway, from the piers to the centre. Other hollow cylinders must be inserted in the spaces on either side of the centre transom, and at every 10 feet distance, additional cylinders, or beams, supporting the wire platform, may be suspended to the main chains, and these can be readily and easily drawn up as tightly as required by the common swivel screws, &c. Three inch planks, six inches wide, to prevent warping, are now placed transversely along the bridge, firmly connected together by upper battens on each side of the road-way and on each side of a central space of seven feet for carriages, and ultimately

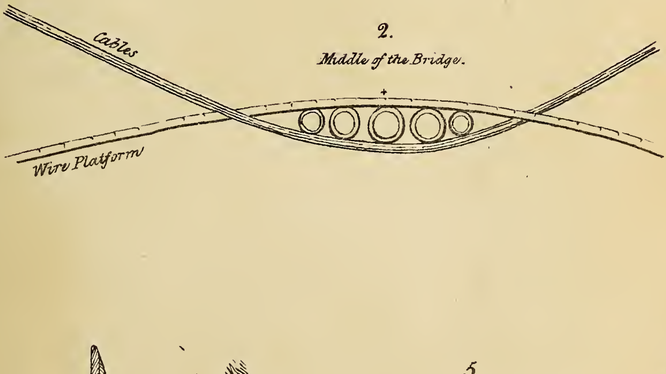
Fig. 1.



3.



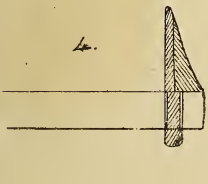
Plan of under side of Platform.



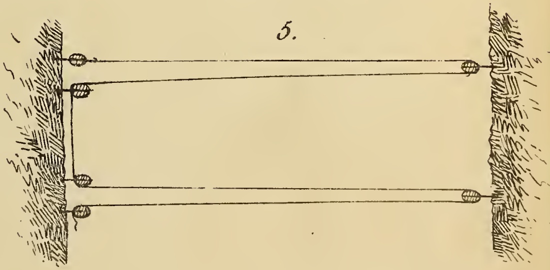
2.

Middle of the Bridge.

4.



5.



fastened to the wire platform by diagonal under ties which are strongly bolted or nailed to the upper woodwork (*Pl. fig.* 3). The cross beams and side battens serve to support the posts, &c. of the railing, and the centre cylinders being allowed to project beyond the road-way a few inches on each side (if thought necessary) would yield additional strength to the centre trussed rail by the application of an outer buttress. *(See Plate, fig. 4).*

From the amazing stiffness which will arise by this mode of uniting the chains and platform, judging from a very rough string model in my possession, the necessity of a trussed railing with all its weight and cost will I am certain be obviated, and any cheap light protection for the sides, which can be conveniently had on the spot, may be substituted. I beg to observe that the wire platform is not to be much strained upwards, and should therefore be originally laid accordingly, and as in all iron suspension bridges the sectional area of the material used is calculated to bear three times the load that can be brought upon them, so in the wire thus disposed and thus regulated, each wire will really be almost as rigid as a bar of wood or iron. Could a greater load than due to its "rigid power," if I may be allowed the term, be applied, then of course the wire by deflecting would yield to the passing load, and the platform be springy and unpleasant. Now, in gales of wind, suspension bridges of the present best construction, having their platforms of disunited portions and swinging below the chains, no under ties can entirely prevent the ruinous undulations and jerking of the whole mass. With the wire platform, however, as this cannot rise, and the chains cannot sink, one very light but unyielding fabric is presented to the storm : and at Madras, (should such a bridge or jetty be ever constructed) the planking might (by a simple process), be rapidly removed before the monsoon, or when threatened by a gale, and there would really not remain more than a few inches of surface to be acted on by the wind. Again, when loaded to the utmost, the platform will naturally sink a little, and thus those wires be spared, while the weight will be properly borne by the suspenders and cables, which are designed accordingly, and from being originally provided with a power three times greater than any *possible* load, cannot much alter their bearings. Deficient as we are in this country of the opportunity and means of putting our notions to a fair test, I cannot help fearing that some objections, not apparent to myself or to those whom I have consulted, may exist to this simple and cheap mode of constructing bridges, and I trust therefore that some of the

valuable correspondents of the Madras Journal will favor us with their opinions on the subject. I say cheap, because of all low priced substances that may be pronounced durable, iron wire has four or five times greater strength in proportion to its sectional area. Thus bars of welded iron are allowed a supporting power of nine tons only per square inch of *sectional* area, while iron wire is admitted to have an average strength of 38½ tons! (the experiments on the continent give 40 and 47 tons per square inch); and the *smaller* wires are stronger in proportion than the *larger*. A single one-tenth inch wire will bear 688½ pounds, that is, such a weight is always safely allowed as its ultimate strength. Now 48 wires $\frac{1}{10}$ inch diameter give a sectional area of 0.376992 inches, and consequently will bear 14½ tons; nearly *four* times the greatest load that can be brought on them in any bridge of twelve feet road-way, with supports ten feet apart; and these forty-eight wires 114 feet long (the calculations having been made for a bridge 112 feet span), will weigh less than 140lbs.; being only 139.86 pounds: and the saving of wire alone in the main chains arising from this decreased load in comparison with an ordinary platform for the same span (although the wire for the new one is taken into account) is so great as to reduce the expense in this item alone, nearly 1000 rupees. At the same time by thus raising the road-way bodily above high water mark, the *basements* of the suspending piers may be reduced in height, and various other important savings will occur by the lessening of Carpenters' work, iron work, &c. &c. To prove that I am not altogether visionary in my views, I annex a copy of a memorandum taken by a friend from the 29th No. vol. 15 of the *Quarterly Journal of Science.*

" *Economical Bridge.*—A bridge of suspension, or rather tension, has " been constructed not long since by M. M. Seguin, near Annonay, " department de l'Ardêche, after the model of those constructed by " the indigenous inhabitants of America. The following description is " from Monsieur Pictet.

" At the place where it is constructed, the river over which it passes " is confined by rocks which have furnished strong points of attach- " ment for the bridge. A band composed of 8 iron wires, each the $\frac{1}{22}$ of " an inch in diameter is attached by its extremity to an iron bolt fixed " in the rock; it then crosses the river at a height of ten feet above it, " and on the opposite side passes round a horizontal pulley three inches " in diameter, also made fast to a rock. The band returns parallel to its

" first direction, passes round one pulley to preserve the parallelism, " and then on to another about sixteen inches distant, from which it " again proceeds over the river and passes round a second pulley on " that side, and finally returns to the side from which it parted, and is " made fast to a bolt in the rock. Thus it crosses the river four times. " Small cross pieces of wood are attached at intervals to these redu- " plications of the band, and over them are placed the planks, parallel " to the wires, which form the foot-way of the bridge *(Plate " fig 5).* Two other bands of wire are carried across the river at a " convenient height on each side of the bridge, to serve as hand-rails; " they are connected by descending wires to the external bands of the " bridge: and, to prevent every lateral motion the bridge is made fast " at the middle to some large stones in the bed of the river.

" This bridge though of a structure so light as to occasion fear on " first time of going on to it, is yet so steady and strong that no sensi- " ble bending or vibration is perceived in passing over it. It is two feet " broad, and fifty-five feet long. The weight of iron wire used in its " construction was about twenty-four pounds, and the expense of the " whole of the materials amounted to little more than 35 francs. " The expense of labour is estimated at about 15 francs, so that 50 " francs according to this account would pay for the whole."

My calculation for the above bridge is as follows :—

Wire $\frac{1}{20}$th inch diameter has a sectional area of..	0.0019635 inches.
This multiplied by the number of wires..........	32
	39270
	58905
	.0628320 sqr. in.
	38
	5026560
Allowing for depreciation of strength by straining, and taking 38 tons pr. square	188496
inch..............................Tons......	2.3876160

We have neraly $2\frac{1}{2}$ tons for the power of the wire employed, but as the planking for 110 square feet and the weight of the wire would make up half a ton, this bridge could safely bear 1 ton, or thirty men, or a loaded palankeen and 12 bearers, were it wide enough.

The wire, 1900 feet in length, at 9 annas per 100 feet (the retail Madras price), would cost 10 rupees 11 annas. The planking about 25 rupees, and the iron, workmanship, &c. about 25 more—total about 60 rupees.

The perusal of the foregoing memorandum some time back led me to think, that iron wire might most advantageously be applied in India (where we are ruined by white ants) as a substitute for woodwork in roofing, and the various calculations I have made convince me, that the day is not very distant, when this valuable material will be extensively employed for that and other purposes. I shall venture to forward to you at a future opportunity, some remarks on roofs composed of hollow cylinders, and my calculations respecting those formed of wire instead of wooden rafters and reaper s.

P. S.—It has occurred to me, that, should iron wire be found to corrode rapidly on the sea coast, and not be effectually preserved by paint, the elastic gum of the banyan tree, or other usual compositions, that coir rope, which is preserved by sea water, might prove sufficiently permanent for the purposes above alluded to.

VIII.—*Description of Sketches of a Self-Registering Barometer on the Float principle.—By* William Gilchrist, *Esq. of the Madras Medical Establishment.*

The subject of a Self-Registering barometer having ccupied a part of several numbers of this Journal, it is with considerable hesitation I venture to make further allusion thereto, and certainly would not do so, did it not appear to me, that the accompanying sketches reduce the instrument to the greatest degree of simplicity of which the principle on which it is based admits.

In applying the float principle to practice, it will easily be comprehended, either that the tube may be made moveable and the cistern fixed, or *vice versa—Fig.* 1 *(Plate)* represents the former of these varieties, fig. 2d the latter.

In the experimental barometer alluded to in my last communication, the float buoyed up not only the tube, but also the ballast required to keep the tube perpendicular. This plan requires a considerable quan-

tity of mercury, but the greatest disadvantage of it is, that, unless the cistern in which the whole floats is very wide, access to the bottom of the tube, to avoid the entrance of air, when it is wished to dismantle the instrument, with a view to conveyance, &c., is prevented. It would not be difficult to contrive a method for overcoming this objection. It has, however, occurred to me, that the float may be placed in a cistern *above* the tube, so that the tube acts as ballast to itself, and the superiority of this plan over the former will at once appear.

Fig. 1—A is the pedestal, furnished with screws and spirit levels, *aa*, to adjust the instrument to the perpendicular. BB pillars to which the whole of the apparatus is attached. C is a cistern, consisting of a broad upper portion *b*, and a narrow lower portion *c*; D is a second cistern of similiar construction. In C is a float to which the rod rising perpendicularly out of it is attached. The other rods connecting the float and the tube E can easily be traced. FFFF are friction rollers which run in grooves in the pillars, and are intended to confine the tube to one line of ascent and descent. The necessity for friction rollers may at first sight appear an objection to the instrument, but when it is remembered that the only power so capable of moving the tube from the perpendicular is the *delicate* spring which keeps the pencil against the register roller, this objection will vanish. H is the register roller, &c. described in a previous communication. I is a scale and vernier index, which will show the height of the mercury at any given time without the necessity of disturbing the registering operation—inspection of the sketch will show that this can be raised or lowered on the pillar; and the tangent screw *d* at top admits of its minute adjustment. The cistern D can also be adapted to any altitude of station by means of the thumb screws near pillars and the screw *e* working in the collar F. By this means the top surface of mercury may be brought to the middle of the expanded portion of the tube when the instrument is put in operation. It is essential in this variety of instrument that the cisterns C and D be furnished with expanded tops, because on any change of atmospheric pressure, the relative height of surface of mercury in those cisterns varies—in the case of C from the dip or immersion of the float, and in the case of D from the same with reference to the end of the tube; also from mercury entering or leaving it. The principle observed here is that of "*capacity*" in the mountain barometer.

The indications may be magnified to any extent, by the relative proportion of area of float in C and of the diameter of tube, as described in a former communication. It is obvious that this instrument is not intended for the ordinary use of the traveller; nevertheless it is desirable that it be made as portable as the principle of its construction will admit of. With this object in view the individual parts are made to screw together as will be observed in the sketch. The next consideration is how to dispose of the tube, so that when detached from the cistern no air will enter. This object is easily accomplished by screwing on a small cistern, as represented (*fig.* 3) on the principle of the Englefield barometer, after the tube has been inclined to fill it with mercury, but before the end is brought out of the large cistern D. The whole ought to be packed in a case constructed to receive the individual parts.

Fig. 2 represents that variety of the instrument in which the cistern is *moveable* and the tube fixed. The whole is attached to one pillar A; on the top of which at B is the expanded top of the tube: the narrow part descends inside of the pillar, comes out at C, and then dips in the cistern D. E is a cistern of similar construction to those in *fig.* 1. In this is a float which, through the medium of rods as represented, buoys up the cistern D. Between the two cisterns the register apparatus F is placed. GG are friction rollers and guides. The pedestal H (of which a top view is given in *fig.* 4) is furnished with screws and levels as in *fig.* 1.

The mode of operation of this variety will readily be comprehended. Suppose an increase of atmospheric pressure to occur: mercury leaves the cistern D to rise into B, and being thus lightened, its float in E rises and carries the cistern with it. The register apparatus records the amount of the movement.

Fig. 5 represents the apparatus for reading off the pencil trace on the rollers. AA is a spindle, on which at *a* is a disc, and at *b* a circular nut which is screwed on after the roller has been put on the spindle, to keep the latter firm up against the disc. The spindle goes through C, in which it is *cone-shaped* like the spindle of a lathe. After the roller and spindle have been placed in proper position, the pointed screw D keeps them so. B, a circular nut, is then put on, by means of which the roller is made to revolve to bring the hour lines successively to the vernier V. The vernier is moved by a tangent screw E, as in the common barometer, which runs along the back of the bar to which it is at-

tached, and communicates with the vernier in front through the elongated narrow opening, as shown in the sketch. F is the scale of inches, which may consist of two or more parts,—the inches being numbered in succession; for if of only one piece, it will be longer than the space between GG, and of course project considerably to the left. H is a joint to admit of the part above it being inclined to the position most favourable for the reading off.

In a former communication it is stated, that when the register barometer is put in operation, the pencil is set at the line in the middle of the roller (for the sake of distinction called *zero line*); and that the height of a common barometer at the time is to be noted. Suppose this height to be 28 inches at 10 A. M., when it is intended to read off the pencil trace, it is evident that the vernier and scale ought to indicate 28 inches, when the former is brought to touch the 10 A. M. hour line. This adjustment of scale and vernier is accordingly to be made, when the latter is to be secured by the screws in GG under which it passes.

The register roller, as formerly explained, registers only the variations of atmospheric pressure, that occur above or below the average barometrical height of the place where it is set in operation. The longer the expanded top of the tube is, the instrument will of course embrace a proportionally greater number of stations of various relative height, without the necessity of moving the cistern D, *fig.* 1. But greater length of expanded top of tube, than what is required for barometrical range, is quite unnecessary, as the adjustment of the surface of mercury to the middle of expanded portion of tube can easily be effected by raising or lowering the cistern D fig. 1 or the cistern E *fig.* 2. Thus at Madras the barometer ranges about 30 inches—on the Neilgherries about 23. The cisterns therefore must be raised about seven inches to admit of their respective instruments being used at the latter station.

IX.—*Table of the Specific Gravities of Aqueous Vapour, Dry Air, and Saturated Air.*—By Lieutenant CAMPBELL, *Assistant Surveyor General.*

Daniel in his essay on the Hygrometer, at page 177 of his Essays, has given a table of the specific gravity of air saturated with moisture, but has incorrectly computed the expansion produced by the moisture absorbed. Galbraith, at page 213 of his tables, gives a table of the specific gravity of dry and saturated air, computed for Dalton's expansion of air, and as I am not aware that a correct table on Gay Lussac's expansion has been published, I have therefore re-computed Daniel's table correctly. In Daniel's table the first column headed "Alteration of volume from heat," the quantities given are,

$$= \frac{T - 32^\circ}{480}$$

T being the temperature of the air.

The second headed "Alteration of volume from vapour."

$$= \frac{30}{30 - FT} - 1$$

FT being the elastic force at the temperature.

The third headed "Increase of density from weight" is the specific gravity of aqueous vapour, and

$$= 10.113 \times \frac{FT}{448 + T}$$

the specific gravity in the fourth volume is

$$= w + \frac{1}{1 + vT + vV}$$

v T the alteration of volume for heat.

v V the alteration of volume for vapour.

w the increase of density from weight.

Thus the expansion of air from the freezing point to the given temperature is made.

$$= \frac{T-32}{480} + \frac{30}{30-FT}\text{, the volume at } 32^{\circ}$$

being unity, but by Gay Lussac's formula for the expansion of a gas on being saturated with moisture, the volume is

$$= v \frac{B}{B-FT}$$

B being the barometric pressure, and the whole expansion from heat and moisture should have been

$$= \left(1 + \frac{T-32^{\circ}}{480}\right) \cdot \left(\frac{30}{30-FT}\right)$$

In the table now given the specific gravity of dry air, is :—

$$= \frac{1}{1 + \frac{T-32^{\circ}}{480}}$$

and the specific gravity of saturated air is

$$= w + \frac{1}{(1 + v\,T) \cdot (1 + v\,V)}$$

The specific gravity of aqueous vapour is the same as given by Daniel, it is entered here for the convenience of computing the specific gravity of air, when not saturated, by the formula, as given by Galbraith,

$$\sigma = \left(a + s - \frac{a.\ FT}{30}\right) \cdot \left(\frac{448 + T}{448 + Dt}\right)$$

σ = the specific gravity of the air when
$D\,t$ = the dew point
Q = the specific gravity of dry air
S = the specific gravity of aqueous vapour } at the temp. T.
FT = the tension of vapour
T = the temperature of the air.

By the same authority is given the subjoined formula for the specific gravity of saturated air, which, it may be shown, is the same as that from which this table has been computed.

$$= a + s - \frac{a.\ FT}{30}$$

Table of the Specific Gravity of Aqueous Vapour, Dry Air, and Saturated Air, for an equable expansion of $\frac{1}{480}$ the volume of air. Air at 32° temperature, and 30 inch prepare being unity.

Temp.	Tension of aqueous vapour.	Specific gravity of aqueous vapour.	Specific gravity of dry air.	Specific gravity of saturated air.
0	0.068	.00153	1.0714	1.0705
1	0.071	.00159	1.0690	1.0681
2	0.074	.00166	1.0666	1.0657
3	0.077	.00172	1.0643	1.0633
4	0.080	.00179	1.0619	1.0609
5	0.083	.00185	1.0596	1.0585
6	0.086	.00191	1.0573	1.0561
7	0.089	.00197	1.0549	1.0538
8	0.092	.00204	1.0526	1.0514
9	0.095	.00210	1.0503	1.0491
10	0.098	.00216	1.0480	1.0467
11	0.103	.00224	1.0457	1.0444
12	0.107	.00234	1.0435	1.0421
13	0.111	.00243	1.0412	1.0398
14	0.115	.00251	1.0389	1.0375
15	0.119	.00260	1.0367	1.0352
16	0.123	.00268	1.0345	1.0329
17	0.127	.00276	1.0322	1.0306
18	0.131	.00284	1.0300	1.0284
19	0.135	.00292	1.0278	1.0261
20	0.140	.00302	1.0256	1.0239
21	0.146	.00314	1.0234	1.0216
22	0.152	.00327	1.0213	1.0194
23	0.158	.00339	1.0191	1.0171
24	0.164	.00351	1.0169	1.0149
25	0.170	.00363	1.0148	1.0127
26	0.176	.00375	1.0126	1.0105
27	0.182	.00387	1.0105	1.0083
28	0.188	.00399	1.0084	1.0061
29	0.194	.00411	1.0063	1.0039
30	0.200	.00423	1.0042	1.0017
31	0.208	.00439	1.0021	0.9995
32	0.216	.00454	1.0000	0.9973
33	0.224	.00471	0.9979	0.9952
34	0.232	.00486	0.9959	0.9930
35	0.240	.00502	0.9938	0.9909
36	0.248	.00518	0.9917	0.9987
37	0.256	.00533	0.9897	0.9865
38	0.264	.00549	0.9877	0.9844
39	0.272	.00564	0.9856	0.9823
40	0.280	.00580	0.9836	0.9802
41	0.292	.00604	0.9816	0.9781
42	0.304	.00627	0.9796	0.9759
43	0.316	.00650	0.9776	0.9738
44	0.328	.00674	0.9756	0.9717
45	0.340	.00697	0.9736	0.9696

Table of the Specific Gravity of Aqueous Vapour, Dry Air, and Saturated Air, for an equable expansion of $\frac{1}{480}$ the volume of air. Air at 32° temperature, and 30 inch prepare being unity.

Temp.	Tension of aqueous vapour.	Specific gravity of aqueous vapour.	Specific gravity of dry air.	Specific gravity of saturated air.
46	0.352	.00720	0.9717	0.9675
47	0.364	.00743	0.9697	0 9654
48	0.376	.00766	0.9677	0.9633
49	0 388	.00789	0 9658	0 9612
50	0.400	.00803	0.9639	0.9590
51	0.414	.00839	0 9619	0.9570
52	0.428	.00864	0.9600	0.9549
53	0.444	.00896	0.9581	0.9529
54	0.460	.00926	0.9562	0.9508
55	0.476	.00957	0 9543	0.9487
56	0.492	.00987	0.9524	0.9466
57	0.508	.01017	0.9505	0.9446
58	0.526	.01051	0.9486	0.9425
59	0.543	.01083	0.9467	0.9404
60	0.560	.01114	0.9449	0.9384
61	0.577	.01146	0.9430	0.9364
62	0.594	.01178	0.9412	0.9343
63	0.615	.01217	0.9393	0·9322
64	0.636	.01256	0.9375	0.9302
65	0.657	.01295	0.9357	0.9281
66	0.678	.013[illegible]4	0.9339	0.9261
67	0.699	.01372	0.9320	0.9240
68	0.722	.01415	0.9302	0 9220
69	0.745	.01457	0.9284	5.9199
70	0.770	01503	0.9266	0.9179
71	0.796	.01551	0.9249	0.9158
72	0.822	.01598	0.9231	0.9138
73	0.849	·01648	0.9213	0.9117
74	0.877	·01699	0.9195	0.9097
75	0.906	·01752	0.9178	0.9076
76	0.936	·01810	0.9160	0.9055
77	0.966	·01861	0 9143	0,9035
78	0.997	.01916	0.9125	0.9014
79	1.028	.01973	0 9108	0.8993
80	1.060	.02030	0.9091	0.8973
81	1.093	.02090	0.9074	0.8952
82	1.127	.02150	0 9057	0.8931
83	1.162	.02213	0.9040	0.8911
84	1.198	.02277	0.9023	0.8890
85	1.235	.02343	0.9006	0.8869
86	1·273	.02411	0.8989	0.8848
87	1.312	.02486	0.8972	0.8828
88	1.351	.02549	0.8955	0.8807
89	1.390	.02618	0.8939	0.9786
90	1.430	.02688	0.8922	0.7865

X.—Note *on certain Mounds of a scoriaceous character found near Bellary.—By the* Editor.

The narrative at page 13, in Mr. Taylor's *Report on the Mackenzie* MSS., of the Hindu tradition concerning the origin of the remarkable hillock of white stone, is curious and interesting on several accounts. My friend Lieutenant Newbold, whose active and intelligent mind is always alive to the observation of natural phenomena, wrote me an account of a similar mound which he visited in 1836, forwarding at the same time a drawing of which I now avail myself.

Lieutenant Newbold thus describes the spot:—" About three miles from Courtney, on the Hospet road, and eleven from Bellary, after crossing a small stream running over a bed of green stone, we ascended a pass, of no great elevation, over the branch running from Soondoor, and forming the Copper Mountain range. On the right of the road, near the top of the pass, surrounded almost and embosomed by hills of considerable elevation, rises a small hill, apparently about forty-six feet high and four hundred and twenty in circumference. The summit is rounded and the surface partially covered with long dry grass, growing thinly; among which jut out masses of tufaceous scoriæ: some, passing in an almost continuous line round the hill, forming, as it were, steps for the ascent. Towards the summit of this mound, which appears to be entirely formed of scoriæ or ashes, the masses are more friable.

" The mound, when struck forcibly by the heel or a heavy stone, emits a sound as if cavernous; and even in riding a horse over the base the same effect is distinctly perceivable. On the top I found a piece of clinkstone and a bit of hornblende rock, which had evidently been scooped by art, and had perhaps once formed part of the bottom of a vessel.

" Around the base, masses of ashes, mingled with fragments of the surrounding formations, trap, and a few bits of iron ore, were scattered. We found two masses of ashes several hundred yards from the spot, but these might have been conveyed thence.

" The hills around appear to be of schistose ferruginous sandstone, based on greenstone slate, in which minute scales of mica are found disseminated. And blocks of a darkly tinted semitrous form, and quartz, are found on the sides. The brook at the foot of the pass there runs over a bed of compact greenstone. The banks are alluvial gravel, over a bed of kankar.

" This singular mound has a curious cineritious appearance, widely different from the ferruginous hue of the surrounding hills, that strikes the travellers eye from some distance. It has been thought, by most people who have seen it, to be of volcanic origin, though I am not aware what grounds they go on.

" My examination it must be confessed was a very short and hasty one, but it appeared to me rather to be the remains of some ancient furnace. There was no appearance of a crater.

" The traditions of the natives affirm that the ashes are the burnt bones of an enormous *Racsasa,* whose funeral pile this was ages ago.

" There are two collection of ashes, similar to these in composition, to be found at the foot of the Copper Mountain near Bellary; the shape of which indicates their having been the work of art. They are much smaller, not conical, but scattered about, and piled into the form of an enclosure; the dimensions of one of which were about 35 yards by 30.

" The ashes of all effervesce with dilute sulphuric acid, indicating the presence of carbonate of lime.

" I should have conjectured that they had formerly been furnaces for the burning of lime, but Captain Lawford of the Engineers tells me no such ashes are formed by the lime kilns now in use. The natives have no account of them beyond the tradition I have just mentioned; so they must be of considerable antiquity. They say such ashes are now formed by burning dead bodies."

Subsequently Lieutenant Newbold transmitted the following legend, obtained from a native, as the *Hindu* history of the Bellary mound:—
" *Boody Canaway* was the place of abode of a giant, called *Edimbausoorah.* It is said in the *Mahabharat* that, about five thousand years ago, five princes, namely, *Durmarajah, Bheemasainah, Arjoonah, Nakoloc* and *Sahaudavah,* sons of *Pandoorajah,* came to this spot on their way to a place of pilgrimage, and halted there one day and night. The giant sent his sister to enquire who they were; she accordingly visited these princes and fell in love with *Bheemasainah,* and never returned to her brother the giant. On this, *Edimbausoorah,* greatly afflicted at her not returning, set out to look for her. He discovered the princes and his sister conversing, and approached them in order to kill and devour them. *Bheemasainah,* who was most valiant, advanced, fought the giant, and killed him at that place, and the remains of his body, are said to compose this rock. It is also said that the teeth of this giant are to be seen upon the mountains of Chittledroog."

At a later date Lieutenant NEWBOLD writes :—" I am told by Cavelly Venkata Lachmiah, President of the Madras Hindu Literary Society, that, during his thirty years career with the late Col. Mackenzie, he met with a few similar mounds in Mysore—viz. two in the Chittledroog country, called *Búdigúnta* and *Búdibetta*—There is also a capital in Mysore named *Búdiha'l*, and in Sundah is found a place on the frontier of Nugger called *Búditippa*.

" These mounds consist of burnt scoriæ of a similar description to the specimens already forwarded to the Society; some are however of a lightish brown and harder in substance, and are supposed to be of greater antiquity than the white variety.

" The various traditions attached to these localities are that the ashes are those of the funeral piles of heroes, and other remarkable persons of antiquity; and some of religious sacrifice, performed by the celebrated holy *Rishis* in their hermitages.

" The Pundits of the Madras Hindu Literary Society are of opinion, that the local legend of the mound near Bellary, is incorrect, as, according to the *Mahabhárat*, the residence of the *Racsása Edimbausoorah* was in a lofty forest, between Benares and the *Paunchah* country, and that he never visited this part of India."

Lieutenant NEWBOLD sent specimens of this scoriaceous substance, with a description of the locality, to the ASIATIC SOCIETY of BENGAL, also; as appears by their *Journal* for *October* 1836, wherein the account is introduced under the title of *Note on the occurrence of Volcanic Scoriæ in the Southern Peninsula.* It seems more than doubtful whether a volcanic origin can be claimed for this mound; and as for the supposition of the calcarious substance being fossil remains, it is still more wide of the truth. The latter surmise could arise only from the tradition of the Hindus of these hillocks being formed by the accumulation of a giant's bones. I am not going to attempt a settlement of the weighty question as to whether the doughty *Edimbausoorah* performed his feats near Bellary or at Benares: my business is only with the physical character of the rock, and I shall take no further notice of the Hindu legend, than to make the passing remark that the circumstance of such strange traditions having been attached to these mounds by the natives, seems to indicate that they really are something extraordinary, whether they be natural productions, or artificially produced by the calcination of calcarious matter. The resemblance of this substance to bone is sufficient to give room for the natives (who

look for no close analogies) so to denominate it; that is to say, it is white and osseous looking, and internally is porous and reticulated, with something the appearance of the *cancellated structure* of bone; but, in configuration, it has no resemblance whatever to the bones of man or animals.

I will proceed to give the opinion of Dr. Benza on two specimens which I sent to him for examination. That eminent geologist writes thus from the Neelgherry Hills, 24th May 1836.

" The two specimens of Newbold in my opinion are nothing else than pieces of *ancient* kankar; one fragment over-calcined and semi-vitrified, the other hardly so much so; which, probably, having been long exposed to the atmosphere, has imbibed again some carbonic acid; it is not certainly pumice, either in appearance or composition, nor any other volcanic product. I should think it a common limestone slag. Near brick-kilns broken bricks are seen, quite similar to the specimens you send, except that they are blackish, or red. The paste of the brick having been half vitrified by excessive heat, gives this appearance. In Calcutta they semivitrify the bricks purposely, for the formation of roads, as they have not any rocks within many miles. Some of the pieces of this burnt clay have more than once puzzled me in India, when found far from any furnace, as straggling pieces; such is their resemblance to porous lava."

I perfectly coincide in the foregoing opinion. The appearance is just what Dr. Benza has described, and the substance resembles no volcanic product that I am acquainted with. The fragments sent to me by Lieut. Newbold are of a grey white colour, hard and brittle in some parts, and more friable in others, for it is not of homogeneous texture or appearance. The exterior of some pieces is shining and vitreous looking, and it is elevated into mammillary protuberances, as it might be from the extrication of air during the cooling down of the heated mass. In the interior it is highly porous, the *cancellæ* being larger in these exterior portions. The substance effervesces feebly with acids, and this is observed to be more the case in one portion than in another.

The isolated character of this hillock, as seen by the representation at *Plate* 6, is singular. An excavation made at the base would most likely solve the question of its origin, that is to say, whether it is an artificial or a natural production. Of its true history it is not likely we shall extract any thing authentic from the fables of the Hindus.

XI.—*Cursory Notes on Wodiahghur and the adjacent part of Goomsoor, and on the People of that Country.—By* W. G. MAXWELL, ESQ. M. D. *of the Madras Medical Service.*

The name *Wodiahghur* seems to arise from the circumstance of the Goomsoor Rajahs having there had a fort, or place of residence, to which they retreated in periods of difficulty or danger. The remains of a small mud fort are still seen, on the east bank of the stream in the open country. The walls are still standing, penetrated with loop holes;—a ditch, partly filled up, surrounds the place, and clumps of bamboos growing from it, denote the pains once taken by the rude chieftains to render it secure. From Nowgaum twenty-five or thirty miles of dark and dreary forest has to be traversed, before the traveller reaches Khondistan ; but then, how delightful the prospect of the sweet and smiling landscape that opens on his view, with scattered villages, and waving crops of grain! While threading the dark and dank forests below, he breathed only a stagnant, suffocating and impure atmosphere ; he now inhales a pure and refreshing breeze.

The whole of the open country, however, appears once to have been covered with jungle, which, year after year, has been thus far cut down by the mountaineers. The mango trees have alone been left standing ; the mountain sides are, every where, studded with them ; they attain a majestic size, and are then cut down by the mountaineers for domestic uses. The doors of their houses are formed of a whole plank of the wood, often four or five feet broad—such however is the rudeness of their tools and workmanship, that they only procure two planks from one tree.

The slopes of the hills are allotted for the pasturage of their cattle, the centres of the valleys for the cultivation of rice;—here there is no occasion for wells or tanks, for the purposes of irrigation;—there is a continual supply of water from the mountain sides, or from the numerous springs that issue from the centre of the valleys. The cultivation of rice is often continued down the steepest descents, in the form of steps, the height from one to another being often six feet.

All the uncultivated spots become annually covered with the *durba* grass *(Poa Cynosuroides)*, growing to a great height, much impoverishing the ground, and completely obstructing the grazing of the cattle. It requires annually to be burnt down just before the rains, and there is soon again abundance of pasturage for the cattle.

Notwithstanding the primitive character of the mountains, the crops of rice are extremely rich; but the constantly decaying vegetable matter, together with the ashes of the burnt-up vegetation, must annually be washed down from the elevated spots, and thus enrich the soil below.

The climate is admirably adapted for the cultivation of European vegetables and fruits of nearly all descriptions; every variety of site, varying in temperature, and in degrees of shelter or exposure, can be chosen, as occasion may require;—and thus a country, discovered by accident, in the very midst of the British possessions, may be now turned to purposes, the ultimate advantages of which, either national or individual, it is at present impossible to appreciate. Now that the country, after the lapse of ages of internal discord, has at last settled down into a state of peaceful quietness and repose, and when the mountaineers perceive the aim and end of government, then will all their energies be directed to call forth the natural resources of their country. Even in the unsettled state of the country at present, the forests are gradually being thinned by the labours of the mountaineers, so that now, when all is quiet amongst them, it is easy to imagine how great a change will soon take place, both amongst the people themselves, as well as on the face of the country. The very process of reconstructing their destroyed villages (made almost entirely of long and broad planks of wood), will, of itself, go far to thin the adjacent forests, and open the surrounding country.

The Khond villages are rather picturesque objects, situated in clumps, here and there, separate and distinct from each other, and surrounded with stoutly fenced enclosures. From ten to twenty houses constitute a village; they are arranged in two rows, forming an oblong oval, and the internal court or area, common to all the members, is secured by strong wooden doors at both extremities. These doors are neatly ornamented with figures of birds, rudely carved, either in *alto relievo* fashion, or stuck on pedestals along the top, or are made to adorn the tops of poles in front of the *muliko's* house, which appears to be in the centre of the range. The walls of the houses are about five feet high,—made of strong, broad and long planks of wood, and the whole is neatly and uniformly thatched (with little slope) from end to end. Each house is generally divided into three compartments, separated by trellis work or planks; the centre space, the largest, is set aside for cooking, and as a general place of meeting; another is for the reception of the yearly

supply of grain, which is put into immense bamboo hampers, many of them from two to three yards square at the top; the third appears to be the sleeping apartment;—above is a loft for the reception of arms of all kinds, or instruments of agriculture. Independent of these, each house has a small long narrow apartment in the rear, which extends half the length of the house; a strong little sallyport opens into this—and another strong door connects it with the enclosures in the rear; but the use of it we could not find out. Every village is overrun with pigs and poultry, and they are very fond of the flesh of the former.

The Khonds are a dark race of men, straight, well limbed, and free from obesity, which makes them have a tall appearance. Many of the men have a pleasing expression of countenance. Generally however the nose is flattish, the face round, and the cheek bones high; the lips and mouth large and often displaying a fine set of teeth; the eye is quick and brilliant. They are clean and neat in their appearance, and wear their hair in a manner quite characteristic, and altogether different from their neighbours, the *Wodiahs*, who tie it in a knot behind. Having combed it all to the front, they roll it up like a large round of tape, and fix it on the forehead, above the right eye. It is ornamented with strips of red cloth, and porcupine quills, or iron needles are stuck into it, which not only ornament and secure it, but likewise prevent their being caught by the hair of the head. By way of additional ornament a little neat iron comb is added to the head gear; some wear the knot differently, and a few others wear the hair loose; but it is principally amongst the young men that the greatest attention is paid to the dressing of the hair. They have little or no beard; perhaps they destroy it with chunam like some of the tribes in the Phillipine isles, as mentioned in Pritchard's History of Man. They have no covering to the head, and, in fact, are naked with the exception of the loins, round which they wind a long narrow piece of cloth, the extremities of which, neatly checquered with red, hang down in front and rear. Some of the headmen wear a red checquered plaid. They are all passionately fond of intoxicating liquors, and they prepare, amongst themselves, a potent description from the buds and flowers of the *Bassia latifolia* called by them *Ippee* (*Mhroanoo tree*) which grows abundantly. Their instruments of war are the battle axe and bow, in the use of which they are extremely expert; clenching the former with both hands, the thumbs supporting the shaft, it is said they can inflict tremendous blows. They have them of all shapes and sizes; the shaft neatly ornamented with brass wire, the point armed with a sharp

piece of iron by which they rest the instrument in the ground. Every Khond is armed either with a battle axe or bow; at home or at the plough, asleep, or busy in the chase, they are always at his side. The bows are either made of bamboo, or of a hard wood they call *Kœly* (the tree of which I did not see). The string is made of a strip of the hard outer rind of the bamboo. The women have no pretensions to beauty ; the mouth is large, and lips protuberant, the nose flat and broad, and cheek-bones high, and the face is tattoed all over with long streaks, three or four parallel, in each place where there is room. The ears stick out and are pierced round the edge with holes, in each of which a piece of stick is inserted. They wear a profusion of different coloured small beads round the neck, principally black; those I saw were scantily clothed, with a checquered cloth.

The Khonds are absorbed in the grossest ignorance and superstition ; and practice that most horrid and ancient of rites, human sacrifice, by the perpetration of which they consider they propitiate the earth, the great object of their wild and frantic adoration, and procure fertility.

This rite, almost of itself, serves to point out the very ancient origin of these people ; but when a fuller vocabulary of their language shall be collected, then all doubts on the subject will be cleared up, and those learned in oriental and classic lore will be able to trace the history and origin of these wild mountaineers.

The description of some of the tribes of the Polynesian isles, as given by Marsden in Pritchard's History of Man, nearly answers for the Khond tribe. He says—" They are rather below the middle stature, their bulk is in proportion. The limbs are, for the most part, slight and well shaped. The women flatten the noses, and pull out the ears of their infants." Whether the Khonds have these practices I know not—but their noses and ears correspond in a certain degree to the description, and are, no doubt, considered marks of beauty. Anderson's account of the New Zealanders, in Pritchard's History of Man, vol. 1st, page 417, Sec. iii. would likewise nearly answer for the Khond tribe.

Regarding the exact extent of country belonging to Khondistan, or in which this language is spoken, I am not prepared to speak. It is evident that they have been encroached on by the people that surround them, and that inter-marriages have likewise taken place, as well as the adoption of forms and customs not originally appertaining to them.

The villages of Calingeah, Coormingeah, Gungabad and Putlingeah, are situated on the very edge of the ghauts that overhang the low country. From the eminences in the vicinity of these villages, the prospect towards the low country is wide and extensive, and presents a vast, interminable forest, on hill and dale, as far as the eye can reach. Before the sun has risen, the view presents a singular appearance, like a vast sea crowded with innumerable islands. The milk white fog every where fills the valleys, and the wooded tops of the hills alone are visible. On looking towards Khondistan, however, the eye is relieved by the open appearance of the country, the eminences that stud the plain are free from jungle and present every variety of tint, and the valleys are cultivated with luxuriant crops of rice.

The range of hills west of Calingeah appears to be very lofty, and to give the directions to the various streams in the neighbourhood; and rivulets rising within a short distance of each other pursue their courses in directions altogether different. How far north the range extends and gives directions to the streams I am unable to say, but I observed that 30 miles beyond Calingeah the streams had a direction north-west.

The stream in the valley of Wodiaghur is extremely rapid, and within the distance of a few miles makes several falls. The first is about a mile and a half above Wodiaghur, where the stream runs close to an eminence on its west bank; and here the bed is rocky, and immense boulders, heaped one above the other, interrupt the noisy descent of the stream for a considerable distance. These appear to have fallen from the adjacent eminence, or rolled down from the mountains higher up the valley. The sand and gravel, largely impregnated with iron, still adheres to the upper surface of the boulders, and the iron having become oxidated, the mass is scarcely to be detached. The rock appears to be compact dark granite.

Farther down the stream, close to Wodiaghur, the waters roll over several perpendicular ledges of rock, each of them five or six feet high, the direction NE. and SW. nearly, and appear to be the same as the last mentioned rocks, as well as a continuation of rocks close on the edge of the stream, piled in huge masses one over the other.

Pursuing the course of the stream, a mile farther down, the waters flow slowly and the bed becomes broad and deep having the appearance of a canal. This is caused by masses of a dark black polished rock running across the bed and forming a dam. The descent over this dyke is rapid, and continues for 30 yards and more. The direction of

the rock is the same as the last, but, except in one place, is not in perpendicular ledges, but the whole mass has a bluff rounded appearance; it does not appear on the banks of the stream, which are high and covered with stunted *Dhoonas* (the *Dammer* tree, *Chloroxylon Dupada*). The rock is full of fissures and little empty cavities.

The mountains surrounding Wodiaghur, are lofty and generally present a bold and rough outline, few of them are strictly conical. Their sides rugged, steep, and often inaccessible. Sometimes eminences are formed of immense masses of rock piled one over the other, of the description of granite already mentioned, and resisting for ever the effects of the weather.

Differing in shape from all the hills in the neighbourhood, is one ofty conical one towards the west, exactly in shape of a sugar loaf, and scarcely with a larger space, in proportion, at the top. The ascent extremely difficult and steep, and the sides covered with debris, which gave way beneath the feet at every step. No rocks made their appearance till at the top, where the surface of those, apparently partially decomposed, presented a red and polished appearance, and structure hard and jaspery. The general appearance of the rock porphyritic. The soil on the hill has an extremely black appearance ; whether the annual combustion of the vegetation, the ashes of which annually bestrew the ground to various depths, may assist in giving this character to the soil, I know not at present, in the absence of analysis. The grass was from six to twelve feet high, and so thick that it was with difficulty we forced our way through.

The rocks, near the level of the plains of Wodiaghur, at various places appear above the surface, presenting quite a different appearance—a granite with large rhomboidal crystals of felspar. Where this rock is level with the ground, or on thoroughfares, the surface is worn down, and parts containing felspar have the appearance of pieces of chalk bruised beneath the feet. At Putlingeah about two hundred and fifty feet up the side of the mountain, I found granite in a decomposed, and decomposing state. The *Chloroxylon Dupada* abounds in all directions above the ghauts, but it is stunted; it is below, in the deep hollows, and sheltered stations, that it attains a great size : the stem is then remarkably straight and lofty, and devoid of foliage ; and the forest has consequently a grotesque appearance; the lofty branches uniting their leaves and forming a dark shade like an artificial canopy. I have traversed a forest of the *C. Dupada* fifty or sixty miles in breadth. I looked long

to see the resin, as we passed along, but saw it not till I made a person climb up a tree and cut me down a large branch; I then found it in distinct, light coloured, pulverizable, slightly aromatic concretions, below, and in the interstices of, the rough outer bark; or at the axils of, or on wounds or knots on the branches. The flower buds had just come out on long drooping panicles. The leaves cordate-acuminate, ten to twelve inches long, seven broad; they are in great demand, and are universally employed for the package of goods of all descriptions. They are also used by every native in the country (Wodiah or Khond), to smoke tobacco in; being rolled up after the fashion of a cigar. The wood is much used for the construction of houses, as well as for firewood; it burns quickly, with a bright flame (from the quantity of resin it contains).

The *Palma maxima*, waving beautifully its soft and verdant plumes, was growing abundantly, both in the vicinity of villages and on the banks and valleys of the forests. The pith of the spine, we found a delightful delicacy when boiled. We used it daily as a vegetable at dinner.

The *Bassia latifolia* I have mentioned as growing abundantly; it is highly prized by the Khonds on account of the intoxicating spirit prepared from the young buds; it is a large timber tree, the wood of which is said to be good for boats and canoes.

The *Bombax pentandrum*, beautiful and majestic in appearance, gives a lively variety to the view; when its crimson flowers bestrew the ground, then, it is said, the work of death begins:—the bloody hue of its blossoms, erect and looking upwards to the skies, as if invoking the deity, may perhaps have taught the tribes to imagine it a sign from heaven for their imitation.

The *Phyllanthus Emblica* is extremely abundant in the jungles, and to the weary and thirsty traveller, its boughs, loaded with the cooling and refreshing fruit, are a welcome sight.

The *Zizyphus Jujuba* was more or less abundant on the more open country. (I may mention here that the variety with fruit the size of the *magnum bonum* is growing near Samulcottah).

The *Semicarpus Anacardium* forms whole jungles; the fruit is much eaten by the natives, and particularly so at present, when all their grain and supplies have been destroyed. They live likewise, at present, a great deal, on the *addakulu chettu kai*. They roast the legumes for a certain time, and then open and eat the fruit. The space on the top of the lofty conical hill was covered with

heaps of empty legumes, which had been roasted, and the fruit eaten by the Khonds. Looking upwards, we saw the majestic creeper, throwing far and wide its sinewy arms, and entwining the surrounding foliage; the branches were still loaded with fruit; we were not long in making a fire for roasting the same, found it excellent, and eat a considerable quantity. The bark of the stem or branches is taken to make the rope used by the matchlock-men for matches, and the leaves are sold in the bazars in the low country for holding rice, &c. at meals.

The plantain was growing abundantly in the jungles; I did not see it cultivated in any of the villages at Wodiaghur.

Tobacco is cultivated, but no care is bestowed upon it; it is therefore extremely inferior and small, and when dried the leaves more resemble tea than tobacco. On the road to Berhampore, I saw it cultivated in considerable quantity at every village, on dry spots of light soil; but there appeared no care in its cultivation. It was allowed to branch out, the leaves were small, and they bore a small proportion to the woody or ligneous portion.

Saccharum off. I saw cultivated at Hadjighur, in a small patch, near the bank of the stream. The mill for expressing the juice was different from that in use in the low country, and rather resembled the oil mill. The *Terminalia alata, Chebula* and *Bellerica* were growing above the ghauts.

Regarding the salubrity of Khondistan I cannot speak so positively as I could wish, the best criterion by which to judge would be the rate of sickness, and its effects during a certain extended period. During the few months I was there, especially on first going up, a good many cases of fever occurred amongst followers and private servants, &c. &c. and indeed amongst all classes, but every case, without one single exception, yielded immediately to that sovereign remedy quinine. These fevers might however have been caught on the way up, still they were not severer than those occurring on the coast of the Northern Circars.

[Dr. Maxwell forwarded with his paper a few rocky specimens from the places described. They are not complete enough to afford a perfect knowledge of the geology of the country, and many of them are decomposed fragments, taken from the weathered surface of the rocks, so that it is difficult to say what they are. It is very evident, however, that the formations are all of the primitive class. Granite abounds, composed of quartz and felspar, apparently with little or no mica; of

great hardness, and coarsely grained, of a dull, yellowish brown colour, resembling the rock of the Neelgherries, specimens of which Dr. Benza presented to the Society ; the felspar is frequently red or flesh coloured, and sometimes white, but generally of a dull colour ; garnets, some large and finely crystallized, abound in some specimens. Fragments of a decayed rock, of porphyritic appearance, are also among the specimens; the felspar of which has decomposed into a fine kind of *kaolin*, which is mottled with red, from the decay of what seem to be garnets. Conglomerates, formed of silicious pebbles, complete the list. A small map of the neighbourhood of Wodiaghur, some outline sketches of the hills, and representations of the axes of the Khonds, accompanied Dr. Maxwell's paper: of which we shall probably make use on a future occasion, when we hope to have it in our power to publish a Memoir on Goomsur by a scientific officer.—Editor].

XII.—*On a new Genus of Asclepiadeæ.—By* Robert Wight, Esq. M. D., F. L. S., &c.

The specimen here figured, from the shores of the Red Sea, was communicated, along with several others from the same interesting locality, by J. Nimmo, Esq. of Bombay. Among the collection, though of small extent, I observed some other plants which appear to be new, but these I have not yet found leisure to examine with sufficient care to determine the point. Owing to my previous familiar acquaintance with the members of this order, a very slight examination was enough to satisfy me that it belonged to a genus new to myself, and a more minute one leaves no doubt of its being distinct from any yet published, so far at least as I have the means of reference.

It is certainly difficult to determine the affinities of this genus. The peculiar structure of the anthers, assuming that the view I have taken of them is correct, that, namely, of each being composed of a half of 2 adjoining deeply divided anthers adhering from the base to near the point, at once separates it from every other described genus: but supposing that the anthers are really what they appear, that is, formed in

Odontandra Reniformus.

the usual way, then their alternate position, with reference to the coronal leaflets, equally distinguishes the genus from all others; Xismalobium being the only one in which an approach to that arrangement is observed, and there, the crown is 10-parted, with 5 of the divisions alternate, and 5 opposite the anthers, which is not the case here.

Odontanthera.—R. W.

Calyx 5-parted. Corolla tubular, 5-cleft; throat crowned with a 5-cleft membranous border; divisions 3-toothed. Staminal crown 5-leaved; leaflets lanceolate, acute, longer than the column. Anthers deeply 2-cleft, divisions united by pairs to near the apex, hence, apparently, alternate with the leaflets of the crown. Pollen masses attached by the apex, pendulous. Stigma, obtuse. Follicles.

Small sub-erect, or perhaps in favourable soil, twining shrubs, with opposite, broadish, somewhat coriaceous, leaves; umbels interpetiolar, many flowered; flowers, from the dry specimen, brownish purple.

Odontanthera reniformis.—R. W.

Habitat—Shores of the Red Sea—Communicated by J. Nimmo, Esq. of Bombay.

A small suffruticose, sub-erect, villous, plant, about four inches high. Leaves long petioled, reniform, terminating in a short abrupt acumen, villous above, tomentose beneath. Peduncles interpetiolar, equalling the petioles, terminated by an umbel of 10 or 12 longish pedicelled flowers. Calyx 5-parted, segments linear lanceolate, acute, villous, shorter than the tube of the corolla. Corolla 5-cleft, segments linear, acute, about as long as the tube; tube enclosing the column of fructification, throat crowned with a 5-cleft membranous border, segments 3-toothed. Crown of the stamens 5-leaved, opposite, but apparently alternate with the anther, leaves, lanceolate, acute, incurved (in drying ?). Anthers 2-parted; each division united to near the apex with that of the adjoining anther, and resting on the corpuscule of the stigma, hence resembling simple anthers, but alternate with the leaves of the crown. Corpuscules large in proportion to the size of the stigma. Pollen masses, ovoid, pendulous from rather long curved processes. Ovaries 2, ovules numerous; styles slender approximated; stigma obtuse.—Fruit I have not seen.

XIII.—*Horary Meteorological Observations made at the Equinoxes and Solstices, agreeably with the suggestions of Sir* John Herschel.

1*st.—At the Madras Observatory.*—By T. G. Taylor, Esq. *H. E. I. C. Astronomer.*

1837.	Time.	Barometer.	Thermometer.	Wind.	Remarks.
Dec. 20	6 P. M.	30,108	79,0	N N E	Gentle wind and cloudless sky.
	7	,126	77,9	do.	do. do. Clear.
	8	,142	77,5	N E	Strong do. do.
	9	,150	77,4	N	Moderate do. do.
	10	,162	77,4	N N E	Strong do. Flying Clouds to the N. E.
	11	,148	77,0	do.	do. do. do. in every part.
	12	,134	76,4	N E	Moderate do. Cloudless sky.
	1 A. M.	,121	76,6	do.	do. do. Scattered flying clouds.
	2	,104	76,4	do.	Gentle do. Clear.
	3	,088	76,4	do.	Moderate do. A few scattered fly. clouds.
	4	,090	76,2	do.	do. do.
	5	,100	75,8	do.	A very do. do. do.
	6	,120	75,8	do.	do. do. Clear.
	7	,142	75,8	do.	do. do.
	8	,174	77,9	N N E	Strong do. do.
	9	,198	78,6	do.	do. do. Flying clouds
	10	,200	79,8	do.	do. do. do.
	11	,186	82,2	do.	do. do. Clear.
	12	,162	79,9	N E	do. do. do.
	1 P. M.	,140	80,8	do.	do. do. Increasing mostly cloudy.
	2	,112	80,8	do.	High do. Mostly cloudy.
	3	,094	80,0	N N E	Strong do. Scattered flying clouds.
	4	,109	79,8	N E	Very moderate do. do. do.
	5	,114	79,4	do.	Moderate do. do. do.
21	6	,116	77,6	do.	do. do. Mostly cloudy.
	7	,124	77,0	do.	Strong do. Flying clouds.
	8	,150	77,0	do.	Moderate do. Mostly cloudy.
	9	,162	76,9	do.	Strong do. do.
	10	,168	76,9	do.	do. do. do.
	11	,158	76,9	do.	do. do. do.
	12				Observatory attendant went asleep.
	1 A. M.				
	2				
	3				
	4	30,088	76,2	N by E	Strong wind Cloudy.
	5	,092	76,2	NE b N	do. do.
	6	,100	75,6	N	do. do.
	7	,136	75,7	N	do. do.
	8	,164	76,4	N N E	do. do.
	9	,186	77,8	do.	do. do.
	10	,188	78,5	do.	do. do.
	11	,168	78,3	N E	Very strong do. do.
	12	,142	79,9	N N E	do. do. do.
	1 P. M.	,106	78,8	do.	do. do. do.
	2	,083	79,2	N E	do. do. do.
	3	,084	79,2	N N E	do. do. do.
	4	,088	74,0	do.	do. do. do. drizzling rain.
	5	,082	74,0	do.	do. do. do. do. do.
	6	,114	72,6	do.	Strong do. do. do. do.

2d.—*At the Trevandrum Observatory.*—*By* J. Caldecott, *Esq.*

Date.	Hour.	Bar. corrected for Temp. 32°	Thermometer.	Depress of W. B. therm.	Dew point.	Direction of wind.	Velocity of do.	Solar radiation.	Clouds—aspect of the sky—and Remarks.
			°	°	°				
Dec. 21	6 A. M.	30.000	72.0	4.8	64.37	N W	3	1.2	Light cum resting on the E. hills, sky perfectly clear, cold breeze
	7	.021	74.1	4.2	67.73	N N W	3	2,25	do do. light breeze.
	8	.041	76.8	4.7	69.90	N by E	3	6.1	do. do. do.
	9	.058	80.5	9.2	66.59	N E.	2	7.2	do. do. do.
	10	.057	82.7	11.4	65.29	N	2	10.8	do. do. do.
	11	.048	84.4	14.0	62.54	E S E	2	11.0	do. do. do.
	Noon.	.010	86.0	12.1	68.23	S	3	13.3	do. do. gentle wind.
	1 P. M.	29.972	86.5	12.7	67.79	do.	4	10.0	do. do. do.
	2	.952	86.5	12.5	68·15	do.	4	6.8	do. do. do.
	3	.934	86.0	12.9	66,77	do.	3	4.4	do. do. do.
	4	.927	86.2	11.6	69.37	do.	2	3.0	do. do. wind just perceptible.
	5	.928	85.2	11.4	68.48	do.	2	3.2	do. do. do.
	6	.949	83.0	9.6	68.98	S by W	2		do. do. do.
	7	.963	81.4	7.6	7[illegible].42	do.	2		do. do. do.
	8	.991	78.3	6.6	68.18	do.	2		Sky perfectly clear do.
	9	30.024	76.9	4.4	69.39	do.	2		do. do. do.
	10	.042	75.2	4.4	68.62	do.	2		do. do. do.
	11	.037	75.4	4.9	68.03	do.	3		do. gentle wind.
	Midn.	.004	73.8	4.8	66.39	do.	2		do. do.
22	1 A. M.	29.978	72.0	3.0	67.40	do.	3		do. do.
	2	.958	71.5	2.7	67.36	do.	4		do. do.
	3	.945	70.9	3.0	66.22	do.	2		do. wind just perceptible.
	4	.948	70.4	2.4	66.67	do.	4		do. cold breeze.
	5	.961	69.8	1.8	67.02	do.	5		Clouds on the E. hills remdr. very clear, pleasant wind.
	6	.975	69.1	0.9	67.72	do.	5	—	do. do. do.
	7	30.006	70.6	1.6	68.16	do.	4	1.0	do. do. do.
	8	.017	75.5	3.5	70.37	do.	2	1.7	do. do. wind just perceptible.
	9	.035	79.6	5.8	71.24	do.	4	5.8	do. do. pleasant wind.
	10	.046	82.5	8.7	69.85	do.	3	7.4	do. do. gentle breeze.
	11	.032	84,0	9.5	70.28	do.	3	11.4	do. do. do.
	Noon.	29.995	85.4	11.4	68.73	S	7	10.3	Light cum and cirrus in the horizon—pleasant wind.
	1 P. M.	.956	85.9	11.3	69.52	do.	4	9.3	do. gentle wind.
	2	.941	85.5	10.6	70.25	do.	5	9.2	Sky very clear, light cum about the horizon, pleasant wind.
	3	.921	85.6	10.5	70.51	S by W	3	2.1	Light cum. dispersed—gentle wind.
	4	.933	84·0	9.4	70.45	do.	3	2.0	Zenith clear cum. about the horizon gentle wind.
	5	.953	83.1	9.1	69.89	do.	3	5.2	do. do. do.
	6	.971	81.5	7.7	70.34	do.	3		do. do. do.

The instruments are the same, and placed in the same situation as before.

3d.—At Hoonsoor, in Mysore.—By WM. GILCHRIST, *Esq. of the Madras Medical Establishment.*

Day.	Hour.	Barometer.	Dry thermometer Fahrenheit.	Wet thermometer.	Winds.	Clouds, &c.	Remarks.
Dec. 21.	6 A. M.						Heavy dew.
	7						
	8						
	9						
	10	27.654	70.5	61.25	E. by S. strong breeze.	Zenith ciri—detached small cumuli at and near hor.	
	11	.640	72.25	63	E. by N. do. do. ...	do. do. do. do. ...	
	12	.612	73.5	62.5	N. E. steady wind........	do. clear—a few detached cumuli western do. ...	
	1 P. M.	.584	75	63	do. breeze	A few detached cumuli over hemisphere.	
	2	.556	75.75	62.75	do. do.	do. do. do.	
	3	.550	77.25	61	do. do.	Zenith do. do. west horizon cum-strati.	
	4	.540	76.5	60	do. do.	do. do. do. do.	
	5	.552	75	59.5	do. light breeze..	do. do. do. do.	
	6	.560	70.25	60	do. airs.	do. clear—a few detached cumuli, near W. hor.	
	7	.570	68.5	59	do. do.	Clear.	
	8	.600	68	59	S. E. do.	do.	
	9	.612	68	59	E. by N. do.	do.	
	10	.616	67.5	59	do. do.	do.	
	11	.606	63.5	58	N. E. do.	do.	
	12	.600	61.25	57	do. do.	do.	
22	1 A. M.	.586	60	56.5	do. light breeze...	do.	
	2	.580	59.25	57	do. airs	do.	
	3	.560	59.5	57	do. do.	do.	
	4	.560	59	56.5	do. do.	do.	

Days.	Hour.	Barometer.	Dry thermometer Fahrenheit.	Wet thermometer.	Winds.	Clouds, &c.	Remarks.
Dec. 22.	5	.600	58.75	56.5	Calm.	Clear.	Heavy dew.
	6	.600	60	58	do.	do.	
	7	.626	61	58	do.	Rather hazy.	
	8	.650	65	61	do.	Several ragged cumuli moving quickly to S. W.	
	9	.660	67.5	61.5	N. E. by E. breeze.	Hem. clear—except a few small cum. moving S. W.	
	10	.652	70	61	do. light do......	Clear.	
	11	.640	73	62.25	N. E. do ...	E. horizon strati—rest of hemisphere clear.	
	12	.602	74.75	63	do. light do......	do. do. do. [cumuli.	7 minutes to 2 P. M.
	1 P. M.	.578	76.75	63.25	do. do. do......	N.E.&S. hor. cum-strati—W. hor. clear—zen. thin	Length of shadow—6.140 inches perpendicular
	2	.552	77.25	64.25	E. by S. do. do......	Hemisphere nearly all overcast with cum-strati.	wire, being six inches.
	3	.55.	77.5	64.25	do. breeze	do. do. do. do. much more dense than 2 P. M.	3 P. M. shadow 9.036.
	4	.550	76.75	63.5	do. light breeze	do. do. do. do.	
	5	.560	75	63.25	N. E. airs.	do. do. do. do.	
	6	.580	74.25	62.25	do. do.	do. do. do. do.	

No rain. The heights of the barometer given, are as read off without correction for temperature, &c. Error of barometer is .042.

XIV.—SELECTIONS.

1.—*Remarks on the real Occurrence of Fossil Infusoria, and their extensive Diffusion; by Prof.* EHRENBERG.

From J. C. Poggendorff's *Annalen der Physik und Chemie*, vol. xxxviii. No. 5, p. 213*.

[The following eloquent passage from the notice of Dr. BUCKLAND'S Geology in the April No. of the *Edinburgh Review*, will have intimated, in general terms, to many of our readers the astounding nature of M. EHRENBERG'S discoveries:—

"Extraordinary as these phenomena (organic remains) must appear, the recent discoveries of Ehrenberg, made since the publication of Dr. Buckland's work, are still more marvellous and instructive. This eminent naturalist, whose discoveries respecting the existing infusorial animals we have already noticed, has discovered *fossil animalcules*, or infusorial *organic remains*; and not only has he discovered their existence by the microscope, but he has found that they form extensive strata of tripoli, or poleschiefer (polishing slate) at Franzenbad in Bohemia,—a substance supposed to have been formed from sediments of fine volcanic ashes in quiet waters. These animals belong to the genus Baccillaria, and inhabit *siliceous* shells, the accumulation of which form the strata of polishing slate. The size of a single individual of these animalcules is about 1-288th of a line, or the 3400th part of an inch. In the polishing slate from Bilin, in which there seems no extraneous matter, and no vacuities, a *cubic line* contains, in round numbers, *twenty-three millions* of these animals, and a *cubic inch* FORTY-ONE THOUSAND MILLIONS of them. The weight of a cubic inch of the tripoli which contains them is 270 grains. Hence there are 187 millions of these animacules in a single grain; or the siliceous coat of one of these animals is the 18 millionth part of a grain!

"Since this strange discovery was made, M. Ehrenberg has detected the same fossil animals in the *semiopal*, which is found along with the polishing slate in the tertiary strata of Bilin,—in the *chalk flints*, and even in the *semiopal* or NOBLE OPAL of the porphyritick rocks. What a singular application does this fact exhibit of the remains of the

* This paper was read in the Royal Academy of Sciences of Berlin on the 7th July, 1836. [The translation is by Mr. W. FRANCIS.]

ancient world! While our habitations are sometimes built of the solid aggregate of millions of microscopic shells,—while, as we have seen, our apartments are heated and lighted with the wreck of mighty forests that covered the primeval valleys,—the chaplet of beauty shines with the very sepulchres in which millions of animals are entombed! Thus has death become the handmaid and the ornament of life. Would that it were also its instructor and its guide!"

In our extracts from other works, we generally have a regard to what concerns the science and literature of the East: but there are subjects (and this is one) of such universal interest, that we do not think we should chronicle the progress of science faithfully or satisfactorily, even as Eastern Reviewers, unless we unfolded them in our pages. The following account is therefore republished from a new scientific work expressly devoted to the proceedings of the European continental *savans.*—EDITOR *Madras Journal.*]

In the month of April of this year I communicated to the Academy* a remarkable fact relative to the infusoria of the mineral springs of Carlsbad, namely that they appeared to be the same species as those met with on the French coast of the Atlantic and in the Baltic. For the knowledge of this fact I was indebted to the kindness of the proprietor of the porcelain manufactory in Pirkenhammer, near Carlsbad, M. Fischer, who, at my request, brought for me to Berlin some of the water containing living animalcules. In order to follow up the examination more closely and more extensively, I requested another supply, which I received a fortnight ago in good condition. At the same time M. Fischer informed me, in a letter dated 20th June, that he himself had made a curious observation. He had remarked that the Kieselguhr† (announced by M. Radig in the Jahrbücher für Deutschlands Heilquellen, &c., edited by MM. von Græfe and Dr. Kalisch, 1836, p. 193), which occurs in the peat-bog of Franzensbad, near Eger in Bohemia, consists almost entirely of the sheilds of Naviculæ, and appears to owe its origin to the action of volcanic heat on the bottom of the sea. M. Fischer sent me, together with this information, a piece of this fossil siliceous body, originally rather more than 2 inches long,

* Compare the Report of the Proceedings of the Royal Academy of Berlin, 1836, pp. 36, 50, and 55; and Wiegmann's Archiv. for Natural History, 1836, p. 240.

† [A kind of siliceous paste; from Kiesel, *silex*, and Guhr, a term used in mining for water carrying dissolved minerals when in a thick liquid state.—W. F.]

1 inch broad, and ¾ inch high, which I have presented to the Royal Mineralogical Cabinet; he requested me at the same to determine the forms of the animalculæ, and to publish his observations together with my results. Microscopical examination directly confirmed the observation of M. Fischer, that the Kieselguhr of Franzensbad consisted almost entirely of Naviculæ; and the great transparency and clearness of the little siliceous shields made it indeed probable that an intense heat had caused their accumulation from a more voluminous combustible substance. But the opinion that they have belonged to the bottom of a sea is improbable, since the chief part of the forms, both from their figure and size, as well as from the number of their inner stripes, agree very exactly with the *Navicula viridis* now living in all the fresh water around Berlin, and widely diffused in other parts. In the sample of the peat-bog there were also to be perceived Naviculæ, which, though mostly different from those of the Kieselguhr, were still living species, and in quite a different proportion to one another, and generally in a smaller proportionate quantity in the same space.

After this the original specimens of the Kieselguhr from the Isle of France, and the Bergmehl from San Fiore in Tuscany, in the Museum of Berlin, which had been chemically analysed by Klaproth, and to which were still attached the descriptions in his handwriting, were microscopically examined. It was found that these substances also consisted almost wholly of several different forms of fossil infusoria, so that the whole siliceous contents given by Klaproth are to be assigned to the infusoria shells.

As early as the year 1834, I announced to the Academy, in the appendix to my third paper on Organization, that, after having examined with M. Henry Rose the discovery made by M. Kützing, that the shields of the Bacillaria consist of silex, this fact was fully established, not only for these, but also for other living forms; a fact which the observations of M. Fischer, and my examination of the Kieselguhr analysed by Klaproth, confirm anew.

As the interest of this phænomenon appeared to be great, I compared several other siliceous and earthy substances from the Royal Mineralogical Cabinet, which Professor Weiss had the kindness to place at my disposal, without however being able to forward the object of the research. At a fortunate moment it occurred to me that such siliceous shields might be in use in the arts as polish, like the siliceous shavegrass, *Equisetum.* I purchased therefore in Berlin several kinds of tripoli and polishing earths for examination. I ex-

amined first the common or leaf tripoli, and found at once that this also consisted entirely of the shells of infusoria. All the others were of a different inorganic nature. A comparison of this tripoli of the shops (which, as I was informed, comes from the Harz and Dresden) with the scientifically arranged species of tripoli in the Royal Mineralogical Museum, showed that this so-called leaf-tripoli is evidently the same stone which was received by Werner as a new species in mineralogy under the name of Polirschiefer (polishing slate), which it has ever since retained. The specimens at hand from the Kritschelberg, near Bilin, exhibited so perfect a similarity, as well outwardly as in the forms of the infusoria of which it consisted, that it is evident that the leaf-tripoli sold at Berlin comes from Bilin in Bohemia, through Dresden. A similar stone to this is the Polirschiefer found at Planitz near Zwickau, if indeed the locality of the specimen examined by me be correct. But the Klebschiefer from Montmartre, which Klaproth has analysed, exhibited only doubtful traces of infusoria shields. The appearance of the fossil infusoria in the form of the Polirschiefer of Bilin is plainly of great importance to our further researches into geognostical relations. In the same slate are found the impressions of an extinct fish, the *Leuciscus papyraceus* of Bronn (according to Agassiz), and several impressions of plants, probably belonging to the tertiary formation.

I had been inclined, even before these researches, to assign a great influence in the origin of the Raseneisen (bog-iron-ore) to an infusorium discovered by me in 1834, and of which I have, in April 1835, given an engraving in Plate X. of my Codex of Infusoria, under the name of *Gaillonella ferruginea*, which is perhaps the same as the *Hygrocrocis ochracea* of botanists. The minuteness of these corpuscles deterred me however from publishing this important circumstance; but since the discovery of so many and various shield-infusoria as stone masses, and since I have found that even the animalculæ which almost entirely form the Polirschiefer of Bilin are also a species of the genus Gaillonella, I no longer hesitate to add this observation to the rest. That the formation of the Raseneisen, or of the Wiesenerz (meadow-earth), as a continual phænomenon excites great attention, and has given rise to many but not sufficiently explanatory theories, is well known. I have every spring observed in the marshes, particularly in the truf districts about Berlin, large quantities of a substance of a very deep ochre yellow, sometimes passing into flesh red, often covering to a great extent the bottom of the ditches from one to

several feet deep, and much developed in small holes and in the foot-steps of animals grazing. This mass is extremely delicate, and without any consistency, dividing itself at the least touch into an indefinite number of parts. Where it has become dry, after the evaporation of the water, it appears exactly like oxide of iron, for which it has been formerly often mistaken. We perceive however under the microscope, with a moderately high magnifying power, extremely slender articulated threads, the members of which measure only $\frac{1}{1000}$ of a line, and in which the yellow colour is inherent. At the beginning of last summer I satisfied myself that these slender articulated threads do not lose their form in a strong red heat, but the colour changes to a red-brown, which is exactly that of iron-ochre. It was found that by the application of muriatic acid the colour was dissolved, without the articulated threads being changed: in the solution precipitated iron was clearly visible. There is also one of the genus Gaillonella, very similar to the Bacillaria, but a very minute organic being, containing a yellow ochre colour, in which there is probably a great proportion of iron, in the same manner as phosphate of lime is contained in the bones. By extraction of the lime, the gelatine of the bones retains, as is well known, its form: in the same manner the *Gaillonella ferruginea* possesses a siliceous shield, which retains its form unchanged after the extraction of the iron.

I have already examined with the microscope various specimens of the Raseneisen from Berlin, from the Ural, from New York, and other places, and find the extremely voluminous yellow iron oxide which is attached to them, and which perhaps has originally served to form them, to consist also of similar connected threads in rows, which resemble the Gaillonella in size, form, and colour, and which are not destroyed by the action of heat or muriatic acid, but no longer form such evident articulated threads as in the living animal. If I compare it, when its fibres are disjointed, with the *Gaillonella distans* in the Polirschiefer, I find no reason to consider the phænomenon in the Wiesenerz-ochre as a different one. I received, through the kindness of M. Karsten, the vegetable products of the mineral water of the salt-works of Colberg, in which there is a yellow earthy substance, in great quantity, formed on the surface. At first it collects at the surface of the stagnant water, as I was informed, in a greenish mass, similar therefore to the protoxide of iron. Dried and exposed to the air it remains of a beautiful ochre yellow, and on being heated it becomes of a red-brown blood-stone colour On dissolving it in muriatic acid I

found a great quantity of iron, with remains of silex. This substance consists, like the marsh-ochre, of articulated threads, which separate into single members: it resembles also very much the *Gaillonella ferruginea.* These Gaillonellæ are used in Colberg for iron-colour in house-painting. The circumstance that this production of the salt-spring collects on the surface of a yellowish green colour, and afterwards sinks to the bottom and changes into yellow, determines perhaps a special and not otherwise characterized species of the same genus.* Thus the siliceous contents of the Raseneisen, and the incombustible organic form of the minute bodies constituting the ochre which surrounds it, make it highly probable that here also an organic relation exists through infusorial formation, though only so far as to form after death, by the large proportion of iron they contain, a central point or nucleus, to which all other iron in solution immediately around it is attracted.

The animals which I found in the above-mentioned fossils are the following species:

I. Nine species in the stone from Franzensbad.

1. *Navicula viridis,* as chief mass; 2. *N. gibba;* 3. *N. fulva;* 4. *N. Librile,* all freshwater animalcules, very common in the neighbourhood of Berlin;—5. *N. viridula;* 6. *N. striatula;* both sea animalcules now living: the first I know of only from the Baltic, near Wismar; the second from near Havre in France, and in the mineral water of Carlsbad;—7. *Gomphonema paradoxum;* 8. *G. clavatum:* both species now common near Berlin;—9. A species of Gaillonella, *G. varians?* of which I have hitherto seen only fragments.

II. In the peat-bog of Franzensbad I found, around the Kieselguhr, five species:

1. *Navicula granulata,* as the most usual form, not occurring in the Kieselguhr; 2. *N. viridis,* rare; 3. *Bacillaria vulgaris?;* 4. *Cocconeïs undulata;* both sea animals;—5. *Gomphonema paradoxum (clavatum?),* still found near Berlin.

Only two forms are common to the turf and the Kieselguhr, which is found in it, and which thence probably owes its origin to a different period.

III. I found in the Kieselguhr of the Isle of France several species:

* Another quantity of this mass sent from the Dürrenberg salt-works has determined this question, since it appears in this that these living animals (?) also are always yellow; that in dying they rise to the surface of a grayish green colour (protoxide of iron), and in sinking to the bottom they again take the yellow colour.

1. *Bacillaria vulgaris ?* as chief mass; 2. *B. major*, an unknown species, but perhaps allied to the former, which is a well-known sea animalcule; 3. A small *Navicula*, perhaps the infant state of *N. fulva*; 4. *N. gibba*; 5. *N. bifrons*, a still living species, occurring rarely near Berlin.

IV. The Bergmehl of Santa Fiora, or San Fiore, of Klaproth's collection contains nineteen different species:

1. *Synedra capitata*, new species, as chief mass, between which 2. *S. Ulna*, an animalcule living both in fresh and sea water; —3. *Navicula inæqualis*; 4. *N. capitata*; 5. *N. viridis*; 6. *N. gibba*; 7. *N. phœnicenteron*; 8. *N. Librile*; 9. *N. Zebra*; all freshwater animalcules;—10. *N. viridula*, a sea animalcule from the Baltic;—11. *N. granulata*; 12. *N. Follis*; two yet unknown or extinct species;—13. *Cocconeïs undulata*, a sea animalcule;—14. *Gomphonema paradoxum*; 15. *G. clavatum*; 16. *G. acuminatum*; freshwater animals from Berlin; —17. *Cocconema cymbiforme*, a freshwater animalcule; 18. *Gaillonella italica*, new species; 19. Siliceous needles of a sea *Spongia*, or freshwater *Spongilla*.

V. In the Polirschiefer of Bilin, specimens of which M. Weiss had himself collected there, I found four species:

1. *Podosphenia nana*, new species, as chief mass; 2. *Gaillonella distans*, new species; 3. *Navicula Scalprum ?*; 4. *Bacillaria vulgaris ?* probably all sea animals.

VI. In the leaf-tripoli of the shops at Berlin, probably received through Dresden or from the Harz, were found three precisely corresponding species:

1. *Gaillonella distans*, as chief mass; 2. *Podosphenia nana*, new species; 3. *Bacillaria vulgaris ?*.

VII. In the Klebschiefer from Menilmontant I in two instances found fragments of *Gaillonella distans*, but am doubtful whether they may not have been derived from the Schiefer of Bilin.

It deserves particular notice, that by far the greater number of these twenty-eight fossil species of infusoria, which all belong to the family of the Bacillariæ, and indeed to eight different genera now existing,—namely the genera Navicula, Cocconeïs, Synedra, Gomphonema, Cocconema, Podosphenia, Bacillaria, Gaillonella,—that of these twenty-eight species, fourteen were undistinguishable from existing freshwater infusoria, and five species from existing marine animals. The other nine

species, therefore not quite one-third, are either as yet undiscovered but existing forms, or extinct ones. It however appears to me more probable, from a comparison of my extended observations of these natural bodies, and bearing in mind the circumstance that no extinct species appear exclusively in the above-mentioned fossil relations, that the new fossil species, among which is no new genus, are not extinct, but still existing ones which have not yet been discovered.

The great mass of the specimens of these animal forms is in very good preservation: many of them are so beautifully preserved, that I have even been able to determine from them the characters of the living species more precisely; for a direct comparison of the latter showed that certain apparent characteristical distinctions are very difficult to be observed in the living ones, and have hitherto been overlooked by me. I first discovered the apertures of the Gaillonellæ in the Polirschiefer, and I now perceive them in all the species of the genus: I have never before seen the six apertures of *Navicula viridis* so beautifully*.

The great sharpness and clearness of all the outlines of all these siliceous shields plainly appears to have been produced by an extraordinary red heat, which has evaporated all organic (particularly vegetable) carbon; for the animals then lived, as at the present day, on plants: at a later period the soluble earths may have become separated, while the silex has better resisted all action. Werner, indeed, was of opinion that subterranean fire had formed the Polirschiefer, an opinion which has much in its favour.

There is a certain remarkable preponderance in quantity of individual species in most of the fossil infusoria whose localities have been mentioned. Thus the Kieselguhr from Franzensbad consists almost entire-

* As botanists have often regarded these forms as plants, the following reasons why they are considered as animals, which I have already often pointed out, are deserving of remark: 1. Many Naviculæ and other Bacillariæ have quite a distinct, powerful, active, crawling motion, by which they move and push aside other bodies much greater than themselves. 2. The projection of an organ similar to the foot of a snail, and whose action assists in crawling, may be directly recognised in many forms. 3. By a close examination all the apertures may be seen, which may be considered as apertures of nutrition, of generation, and of motion. 4. Internal organs may be distinguished, which may be compared with the polygastric bladders of the infusoria, and others with the crowned ovary. 5. The infusoria are propagated, besides the highly probable egg-formation, not by buds as in plants, but also distinctly by separation, a method of propagation which is wanting in all decided plant-formations, but which is observed in many decided animals. 6. Some forms, whose motion is very slow, or which attach themselves like oysters, afford no reason why they are therefore to be considered as plants. Compare the Report of the Academy of Berlin, 1836, p. 34.

ly of *Navicula viridis*; the mass from the Isle of France of *Bacillaria vulgaris*; that of San Fiore of *Synedra capitata*; and that of Bilin is so entirely formed of *Gaillonella distans* that the other species of animalcules are only scattered through it.

Finally, the proportion of these animals merits a passing attention. The millions of the tribe of infusoria have often been mentioned, and spoken of almost without consideration of their number, perhaps because little belief is entertained of their corporeality. They have often been regarded as drops of oil and appearances of various kinds; but since the Polirschiefer of Bilin must be acknowledged to consist almost entirely of an aggregation of infusoria in layers, without any connecting medium, these infusoria begin to acquire a greater importance, not only for science, but for mankind at large. The Kieselguhrs occur, it is said, only in nests about the size of a fist or a head, and probably may be of comparatively recent origin. With the Polirschiefer it is different; this forms widely extended layers, containing fossil plants and fishes. A single druggist's shop in Berlin consumes yearly more than 20 cwt.: the consumption therefore of infusoria as tripoli and for casting-moulds in Berlin and the environs may be perhaps estimated at 50 to 60 cwt. yearly, and thence we may in some measure infer the sale in Bilin. I hope to receive in a short time more extensive details on this subject: it is sufficient at present to say, that the infusoria supply all the requisite demands for purposes of practical utility. Passing over the share they have in the Raseneisen, the soldier cleans his arms with tripoli; the worker in metal, the locksmith and the engraver polish with infusoria, which serve also for moulds in founderies. These animals which are so useful after death, and form entire rocks, have at present a more special interest in their individuality. The size of a single one of these infusoria, which form the Polirschiefer, amounts upon an average and in the greater part to $\frac{1}{288}$ of a line, which equals $\frac{1}{6}$ of the thickness of a human hair, reckoning its average size at $\frac{1}{48}$ of a line. The globule of the human blood, considered at $\frac{1}{300}$, is not much smaller. The blood globules of a frog are twice as large as one of these animalcules. As the Polirschiefer of Bilin is slaty, but without cavities, these animalcules lie closely compressed. In round numbers, about twenty-three millions of animals would make up a cubic line, and would in fact be contained in it. There are 1728 cubic lines in a cubic inch, and therefore a cubic inch would contain on an average about 41,000 millions of these animals. On weighing a cubic inch of this mass, I found it to be about 220 grains. Of the 41,000

millions of animals, 187 millions go to a grain, or the siliceous shield of each animalcule weighs about the $\frac{1}{187}$ millionth part of a grain.

The animalcules of the Raseneisen are only $\frac{1}{1000}$ line in diameter, or the $\frac{1}{21}$ part of the thickness of a human hair, $\frac{1}{3}$ of the diameter of a globule of the human blood, $\frac{1}{8}$ of the blood globule of a frog. A cubic line of such animal iron-ochre would thus, in the same relation, contain one thousand millions, one cubic inch one billion, and one cube of nine feet diameter one drillion, of living beings. If we suppose only one fourth of this multitude to be really present, and take no notice of the other three-fourths, there yet remain such enormous numbers as to merit the greatest attention.

Further Notices of Fossil Infusoria; by Prof. EHRENBERG.

From Poggendorff's *Annalen der Physik und Chemie*, vol. xxxviii. No. 6, p. 455, 1836.

It has been announced as a well-ascertained fact, that the Polirschiefer of Bilin in Bohemia, which is a member of the tertiary formation, consists almost entirely of the siliceous shields of *Gaillonella distans* and other infusoria, without any foreign cement. The recent Kieselguhr and the Bergmehl, from San Fiore, which are of less geological interest indeed, consisting of larger infusoria shells, are better adapted than the Polirschiefer (whose minute animalcules require a high and clear magnifying power) to make these organic relations more apparent and convincing. The kind exertions and reports of M. Alexander von Humboldt, who lately visited the district of Bilin in his journey to Teplitz, and sent me two very rich collections of the mineral products of that district, in various states, have furnished new materials for the furtherance of my observations.

Before I speak of this valuable addition to our subjects for investigation, I may mention, that an examination of the Polirschiefer of Planitz (of which, by the friendly intervention of M. Weiss and the liberality of M. Freiesleben in Freiberg, I have been enabled to examine a specimen whose locality was quite certain), has shown with certainty that this layer also is a conglomeration of infusoria shells. The specimen examined resembled the Saugschiefer of Bilin, and the infusoria shells of the *Gaillonella distans* are here filled with and connected by a siliceous cement, which somewhat mars the distinctness of their form; I have, however, seen some so plainly that I am convinced of the identity

of these two formations. There is probably also in Planitz a more earthy form of this stone, similar to the loose Polirschiefer, which is chiefly formed of the unchanged *Gaillonella distans.*

A specimen of the Polirschiefer from Cassel, which M. Carus of Dresden had the kindness to send me, and in which he had also recognized organic forms, was particularly interesting.

I found in the Royal Mineralogical Cabinet some specimens with petrifactions of fish, the *Leuciscus papyraceus,* from the same locality. I have also lately been able, through the kindness of M. Keferstein of Halle, to examine specimens of the stone from the Habichtswald near Cassel. This Polirschiefer of Cassel contains seven different species of shield-infusoria, between which is a loose, and, for the most part, siliceous cement, which cannot be plainly reduced to organic fragments. It is worthy of notice that most of the forms in the Polirschiefer from Bilin and Planitz are either extinct or as yet undiscovered ; while at the same time those forms which resemble existing species, belong to such as are not very striking, and therefore less sure for the detection of their identity ; but in the Polirschiefer of Cassel two of the most remarkable existing forms occur, namely *Gaillonella varians* and *Navicula viridis*: *Navicula striatula* appears also to occur in this Polirschiefer. *Gaillonella varians* and *Navicula viridis* appear both in the tertiary formation of Cassel and in the Bergmehl of San Fiore, and these have a form related to that of *Navicula Follis.* Besides 1. *Gaillonella varians,* 2. *Navicula viridis,* 3. *Navicula striatula* ? 4. *Navicula Crux* (comp. *Navicula Follis* adulta), I have also found in the stone from Cassel, 5. *Navicula fulva* juv. ? 6. *Navicula gracilis* ? and 7. *Navicula Cari,* n. species,—three less clearly defined species : the last however is very numerous and is unknown to me. Besides these ascertained relations of the distribution of the Infusoria-schiefer as Polirschiefer, the rich parcel sent by M. von Humboldt from Bilin and the valley of Luschitz has given rise to very important observations. It consists of a small collection of minerals from Bilin, made by Dr. Stolz of Bilin, of a larger one by Dr. Reuss, and also of a great number of specimens collected by M. von Humboldt. A careful geognostical drawing by Dr. Reuss explains the position of the rock-masses of that district.

The infusoria rock of Bilin forms the upper layer (fourteen feet deep) of the Tripelberg, which (differing from the Kritschelberg, with which it was formerly confounded) is elevated about 300 feet above the level of the brook Biela. It lies on a bed of clay, which is superincumbent to the chalkmarl. Beneath these gneiss is found, as the base of all the minerals of that district. The upper masses of stone lie west of the

Tripelberg on a projected mass of basalt, which forms the Spitalberg, and on the other side of which (west) Grobkalk, with many discernible petrifactions of small chalk sea animals (many Crinoideæ) lie on the gneiss. The firmer masses (Saugschiefer and Semi-opal) lie in the Polirschiefer towards the exterior upper part, the earthy below, disposed often without order in layers, the inferior ones being almost horizontal.

The particular attention paid to the Saugschiefer and semi-opal, whose numerous transitions were exposed to view, has now given the scarcely unexpected result that these also are in the closest connection with the infusoria.—The Saugschiefer is, upon microscopical observation, plainly only a Polirschiefer, whose infusoria shells are cemented by and filled with a formless siliceous matter, just as there are fossil shells both filled and empty: this produces its greater specific weight, and all its other characters. In the gradual transitions to the semi-opal we see how the cement has increased at the expense of the infusoria shells, while the small shells have decreased in quantity and in sharpness of outline.

The formation of the semi-opal in the Polirschiefer appears to be this, that it lies imbedded in it in nodules, in the most minute transitions from the Saugschiefer. A close microscopical analysis of the most varying semi-opals from Bilin, and the neighbouring valley of Luschitz, has shown that all these stone nodules, which sometimes equal flint in hardness and give sparks, consist partly of infusorial forms held together by a small quantity of transparent siliceous cement, and partly contain inclosed within them single infusoria, but of a larger size, just as amber contains insects. It is often very plainly to be seen, that the disposition of the Polirschiefer has not otherwise been altered, either by its change into Saugschiefer (cemented and permeated by amorphous siliceous matter), or by its change into semi-opal, than that by some means a part of the infusoria shells, particularly the more delicate ones, have been eaten away or dissolved, with which another part, especially of the larger forms, has been covered in an unaltered state. In this process the stratified structure remains as fully visible in the Polirschiefer as it had before been, and forms the stripes of the semi-opal. The white and less transparent stripes are mostly well-preserved layers of infusoria. It is not improbable that a dissolving medium may have acted upon the siliceous shells as drops of water or steam act on meal. The parts in contact with it were gradually penetrated, and partly dissolved and changed into opal; or the penetrating matter, producing the opal, and which occupies but a small space, has

assimilated to itself a greater or less part of the empty siliceous shells. The true wood-opal, in which the woody substance is changed into opal, renders the opinion probable that a peculiar opaline mass has supplanted the decayed and dissolved parts of the woody substance, retaining however its form. We cannot easily imagine the expulsion of the siliceous shield-mass by the opal-mass, and of the latter filling its space: therefore it appears conceivable that the opal may be probably formed from the infusoria shells, simply by water or any other dissolving medium except fluoric acid, just as dough is formed of meal. Unkneaded dough contains stripes of meal,—semi-opal has often stripes of infusoria: both are hydrates.

In the semi-opal of Bilin and of the valley of Luschitz were visible, inclosed like insects in amber, 1. *Gaillonella distans*; 2. *Gaillonella varians*, particularly the larger individuals; 3. *Gaillonella ferruginea*; 4. siliceous needles of sponges. The first is mostly dissolved, at times preserved as principal mass, with the outline rather rounded off, although the connecting medium has quite a glassy appearance. The second is mostly well preserved, but rather rounded off; the third is sometimes well preserved in the buff-coloured specimens, but on account of its minuteness does not admit of a determining character. The latter however is not unimportant with regard to the question of the action of volcanic agency: it may perhaps have been deposited in the moist parts of the previously formed Polirschiefer. Upon heating this yellow semi-opal, it became red and acted as iron. The red was the articulated fibres of the Gaillonella: they could not therefore possibly have been heated in the air. The tranquil horizontal stratification of the Polirschiefer (exhibiting perhaps the yearly or periodical deposition of the layers) speaks also for a neptunian action. Hot vapours of the volcanic neighbourhood might have much contributed to the purifying of the mass, without actual fire. The semi-opal of Bilin removes all doubt as to these organic relations.

Very similar formations, with inclosed forms of organic origin, were also apparent in the semi-opal from Champigny, that out of the Dolerit from Steinheim near Hanau, and that from the serpentine formation of Kosemitz in Silesia. The microscopical bodies inclosed in this stone, very apparently of a spherical form, and *never occurring larger*, which are also attached externally to the semi-opal or hornstone from Kosemitz as a white meal, and filling out its internal cavities, might partly belong to the still existing genus *Pyxidicula*. They are quite different from the stalactitic columns which produce the round eyes in agate.

It was natural for me now to test again the flint of the chalk, which I had before often examined: and this time I employed a higher power and therefore with more success. The black flint, which broken into small pieces is transparent, showed no evident traces of an inclosure of microscopic organic bodies, but such are easily perceptible in the whitish and yellowish opake pieces. The more rare horizontally striped specimens are very similar to the striped semi-opals. They all contain spherical and often needle-shaped bodies, at times with apertures, which can scarcely be an optical phænomenon, and which are covered by a transparent siliceous matter. There are sometimes seen in the latter, as in the *Gaillonella varians* of Cassel, radial stripes proceeding from a pierced centre to the periphery, and also somewhat plainly a separate defined shell. The chalk-like envelope and white covering of the flint does not effervesce with acids, and is therefore not chalk, but silica, as I have convinced myself; it does not appear to originate in decomposition, but is like the meally covering of a lump of dough; that is to say, it is that layer of siliceous meal (of evident organisms) which at the formation of the flint has only been touched by the dissolving or metamorphosing matter, but not completely penetrated by it. According to this the flint would be formed nearly in the same manner as the semi-opal of the Polirschiefer. The siliceous parts of the chalk would, from their specific gravity, accumulate in certain places, and form layers of siliceous Bergmehl in the chalk; in the same manner as we see in high perpendicularly cut heaps of rubbish, things of the same specific gravity, mortar, pieces of porcelain, bones, &c., arranged separately in stratified horizontal layers. If now a dissolving elastic or other fluid forced its way into the heap, those nodules must also be formed in horizontal layers and nests, which have already attracted the special attention of geologists, and of which some at times take the form of Holothuriæ and corals; the greatest number however, partly on account of their enormous volume and partly from their wholly undetermined forms, present great difficulties to this hypothesis. In the Menilite the nodule formation of a penetrating substance, itself occupying scarcely any space, and not changing the layers of the primitive mass, is particularly well seen.

I have finally to mention the examination of the precious opal of Kaschau. In some fragments both of the common serpentine opal of Kosemitz and of the precious porphyry opal of Kaschau, I saw also inclosed round bodies like those in the flint; the greatest mass was however in the interior homogeneous. I examined the matrix of the pre-

cious opal, and found that a mass similar to Steinmark (lithomarge) always immediately surrounds the nodules. This Steinmark of Kaschau exhibits however, under the microscope, a great resemblance to the *Gaillonella distans*, as it appears in the Saugschiefer of Bilin. I have, from the remarkable character of the primary formation, repeatedly examined and compared these and similar phænomena, and prefer to declare them openly than to keep them secret. I shall however continue my observations with close examination, and publish the results if they lead to any discovery, when they are sufficiently matured.

The more probable appears the proverb, partly old and partly new, *Omnis calx e vermibus, Omnis silex e vermibus, Omne ferrum e vermibus*, the more necessary it is, by continual and close examination, which cannot be the work of a day, to separate facts from opinions, and not to envelope them in mystery, but by careful observation to confine them within the probable and attainable limits which nature has assigned. We may regard as hitherto ascertained facts that

1. Bergmehl } Newest formation.
2. Kieselguhr }
3. Polirschiefer .... }
4. Saugschiefer..................... } Tertiary formations
5. The semi-opal of the Polirschiefer }

consist entirely or partly of the shells of shield-infusoria.

The following species of stone are *very probably* of the same nature:

6. The semi-opal of the Dolerit...... }
7. The (precious) opal of the porphyry } Secondary and primary formations.
8. The flint of the chalk.............. }
9. The Gelberde (yellow earth) } Newest formation.
10. The Raseneisenstein....... }
11. Certain kinds of Steinmark*.—*Scientific Memoirs, vol.* i. *part* iii.

* The examination of a boulder from the Mark (Brandenburg) which has been regarded as Schwimmstein (compare Klöden, Geognost. Mem. 1834, p. 30.) has lately proved to me that its chief mass consists of just the same detached siliceous spindles of sponges and of the minute globules (infusoria *Pyxidicula* ?) which the flint boulders of the Mark inclose in great numbers. These bodies also lie in the meally covering of the flint. This Schwimmstein therefore bears the same relation to the flint as the Polirschiefer to the semi-opal, and it belongs to the chalk.

2d.—*Notices concerning the Periodic Meteors, or supposed Asteroids.*

1.—*On the Meteoric Showers of November* 1836.—By Denison Olmsted, Professor of Natural Philosophy and Astronomy in Yale College.*

For six years in succession, there has been observed, on or about the 13th of November of each year, a remarkable exhibition of *shooting stars,* which has received the name of the "Meteoric Shower."

In 1831 the phenomenon was observed in the State of Ohio,† and in the Mediterranean, off the coast of Spain.‡ In 1832, the shower appeared in a more imposing form, and was seen at Mocha, in Arabia;|| in the middle of the Atlantic Ocean;§ and near Orenburg, in Russia;¶ and at Pernambuco, in South America.** The magnificent meteoric shower of 1833, is too well known to require the recital of any particulars. Of the recurrence of the phenomenon at the corresponding period in 1834, and in 1835, evidence has been presented to the public in previous numbers of this Journal. (See vols. xxvii. pp. 339, and 417; xxix. 168). I now feel authorized to assert, that *the metoric shower reappeared on the morning of the* 13*th November* 1836.

It has been supposed by some, that the appearance of an extraordinary number of shooting stars, at several anniversaries since the great phenomenon of November 1833, can be accounted for by the fact, that so general an expectation of such an event has been excited, and that so many persons have been on the watch for it. Having, however, been much in the habit of observing phenomena of this kind, I can truly say, that those exhibitions of shooting stars which have for several years occurred on the 13th or 14th of November, are characterized by several peculiarities, which clearly distinguish them from ordinary shooting stars. Such peculiarities are the following:

1. The *number of meteors,* though exceedingly variable, is much greater than usual, especially of the larger and brighter kinds.

2. An uncommonly large proportion leave *luminous* trains.

3. The meteors, with few exceptions, all appear to *proceed from a common centre,* the position of which has been uniformly in nearly the same point in the heavens, viz. in some part of the constellation Leo.

* Silliman's Journal, vol. xxxi. p. 386.
† Amer. Journal of Science, vol. xxviii. p. 419.
‡ Bibliotheque Universelle, Sept. 1835.
|| Amer. Journ. xxvi p. 136.
§ Edin. New Phil. Journ. *July* 1836.
¶ Ibid. 349.
** New York American, Nov. 15, 1836.

4. The principal exhibition has at all times, and at all places, occurred between midnight and sunrise, and the *maximum from three* to four o'clock.

In all these particulars, the meteoric showers of 1834, 5 and 6, have resembled that of 1833; while no person, so far as I have heard, has observed the same combination of circumstances on any other occasion within the same period. I have not supposed it necessary, in order to establish the identity of these later meteoric showers with that of 1833, that they should be of the same magnitude with that. A small eclipse I have considered a phenomenon of the same kind, with a large one; and, conformably to this analogy, I have regarded an eclipse of the sun, first exhibiting itself as a slight indentation of the solar limb, but increasing in magnitude at every recurrence, until it becomes total, and afterwards, at each return, but partially covering the solar disk, until the moon passes quite clear of the sun,—as affording no bad illustration of what probably takes place in regard to these meteoric showers. The fact, that the Aurora Borealis appears unusually frequent and magnificent for a few successive years, and then for a long time is scarcely seen at all, was proved by Mairan a hundred years ago.* There is much reason to suspect a like periodical character in the phenomenon in question, which first arrested attention in 1831, became more remarkable in 1832, arrived at its maximum in 1833, and has since grown less and less at each annual return. Some seem to suppose, that we are now warranted in expecting a similar exhibition of meteors on the morning of every future anniversary; and this, I think, is not to be expected. It is perhaps more probable, that its recurrence, unless in a very diminished degree, will scarcely be witnessed again by the present generation. The shower, however, at its late return, was more striking than I had anticipated; and it must be acknowledged, to be adventurous, to enter the region of predication respecting the future exhibitions of a phenomenon, both whose origin and whose laws we so imperfectly understand.

Accounts of observations before us shew, that the meteoric shower was seen in most of the Atlantic States, from Maine to South Carolina.

From these accounts compared, we are led to conclude that the meteoric shower increased in intensity from north to south, that of South Carolina having been the most considerable of all, so far as accounts have reached us.

* Traité Phys. et Hist. de l'Aurore Boreale. Par. M. de Mairan. Memoirs of the Royal Academy of Sciences for 1731.

Does not the recurrence of this phenomenon for six successive years, at the *same period of the year*, plainly shew its connection with the progress of the earth in its orbit? and does not the fact, that the greatest display occurs every where in places differing widely in longitude at the *same hour of the day*, as plainly indicate its connection with the motion of the earth on its axis? The supposition of a body in space, consisting of an immense collection of meteors stretching across the earth's orbit obliquely, so that the earth passes under it in its annual progress, while places on its surface lying westward of each other are successively brought, by the diurnal revolution, to the point of nearest approach, will satisfy both these conditions. I can think of no other that will. The "point of nearest approach" may be merely the extremity, or the *skirt* of the nebulous body; while the greatest part of it, and, consequently, its centre of gravity, lies too distant from the earth to be much influenced by its gravity. It would not be at all inconsistent with the known extent of astronomical bodies, to give to the body in question a breadth of thousands, and a length of millions of miles. It was an accidental observation, made after the conclusion was formed, which ascribes the origin of meteoric showers to a revolving nebulous body, that first led me to suspect the *zodiacal light* to be the body in question. This, according to Laplace, *is* such a nebulous body, revolving round the sun in the plane of the solar equator.*

We actually observe it to reach over the orbit of the earth, making an angle with its plane of only seven and a quarter degrees. It is not difficult to place it in such a situation, that the earth shall come very near to the *skirts* of it at least. We should, indeed, expect this meeting of the two bodies to take place at the nodes of the solar equator and therefore in December and June instead of November and April. It is easily conceivable, however, that the aphelion of the zodiacal light, at which place it approaches nearest to the earth, does not lie exactly at the node, but so far from it that the earth passes it a month before it comes to its node, at which time, moreover, the earth is more than a million of miles nearer to the sun than its mean distance. In endeavouring to fix the *periodic time* of the meteoric body, since it must be either a year or half a year (for no other periodic time could

* Mec. Celeste (Bowditch), vol. ii. 525.

bring the two bodies together at intervals of a year*), several considerations induced the belief, that *half a year* was the true period, an inference drawn especially from the apparent great excess of velocity of the earth at the point of concourse; but the period of *a year* (or, more probably, a little less than a year), by implying that the two bodies are always comparatively near to each other, would better explain the occurrence of shooting stars at all seasons of the year, and would be particularly favourable to the explanation of those meteoric showers which have on two occasions at least,† occurred near the last of April, a time distant about half a year from November, and therefore sustaining a like relation to the opposite point of its orbit. In such a case, meteoric showers would occur in April and November, for the same reason that the transits of Mercury take place in May and November exclusively. The greater frequency of meteors in November than in April, naturally results from the greater proximity of the earth to the sun at the former than at the latter period; to which, perhaps, may be added the effect of the eccentricity of the orbit of the meteoric body, the aphelion being on the side of November. In the present state of our knowledge on this subject, I regard it as a point open for inquiry, whether it will best accord with all the phenomena of shooting stars, to give to the meteoric body a period of nearly one year, or of half a year.

I have been somewhat disappointed that the astronomers should have paid so little attention to the remarkable changes which take place in the zodiacal light about the 13th of November, as has been repeatedly mentioned in this Journal. It appears to me a fact deserving their attention, that the zodiacal light, which for weeks before the 13th of November appears in the morning sky, with a western elongation of from 60 to 90 degrees from the sun (while up to that time not a glimpse of it can be caught in the evening sky), should immediately afterwards appear after the evening twilight in the west, and rapidly rise through the constellations, Capricornus and Aquarius, to an elongation of more than 90 degrees eastward of the sun, while it as rapidly withdraws itself from the morning sky, and within a few days vanishes entirely from the western side of the sun. For three years past I have observed these changes with much interest, and feel warranted in

* See vol. xxvi. p. 166, of this Journal.

† In Virginia, and various other parts of the United States, in 1803, and in France in 1095 making suitable allowances for the more rapid progress of the earth through the winter signs, and for the change of style, and the meteoric shower of the 20th of April 1095, occurred at very nearly the very opposite point of the earth's orbit.

asserting that they have been repeated with uniform regularity. The present year the light was very feeble in the morning sky, an effect partly owing to the presence and peculiar splendour of the planet Venus; but as soon after the 13th of November as the absence of the moon would permit observations, the light appeared in the west immediately after twilight, crossing the Milky Way, and rising in a pyramid almost as bright as that, the triangular space between it and the Galaxy, embracing the Dolphin, appearing by contrast strikingly darker.

I can account for this great and rapid change of place in the zodiacal light, a change which is unlike any it sustains at any other period of the year, only by supposing that on or about the 13th of November it comes very near to us, and that we pass rapidly by it, thus giving it a great parallactic motion, an effect which is in perfect accordance with all our previous conclusions.

According to this view of the subject, *the zodiacal light would no longer be regarded as a portion of the sun's atmosphere, but as a nebulous or cometary body, revolving round the sun within the earth's orbit, nearly in the plane of the solar equator, approaching at times very near to the earth, and having a periodic time of either one year, or half a year, nearly.*

Such, I affirm, would be the fact should the zodiacal light be proved to be the body which affords the meteoric showers.—*Edinburgh New Phil. Journ. for July—Oct.* 1837.

2.—*Notice respecting the Periodic Meteors of the* 13*th of November.*— *By M.* L. F. Wartmann.*

A Cosmological phænomenon of the most interesting kind, although new as yet in the records of science, is at present attracting the attention of astronomers, meteorologists, and physicists. The magnificent assemblage of luminous points and globes which has been seen for several years presents a highly important subject of inquiry, by which we may be enabled to add to the stock of our knowledge respecting the constitution of our planetary system.

The appeal made upon this occasion by M. Arago spread far and wide, and this very year [1836] numerous observations, made in differ-

* From the *Bibliotheque Universelle*, N. S. 2 de Ann. No. 18, June 1837; having been read before the Society of Physics and Natural History of Geneva, Dec. 15, 1836.

ent places, have been sent to the illustrious philosopher who had asked for them. They concur in showing that, towards a point of the heavens at a small distance from the stars β and γ in the constellation Leo, a considerable quantity of shooting stars seem to be produced, and to succeed one another at short intervals, precisely in the place where a prodigious number of them had already been seen at Geneva in 1832, and especially in the United States in 1833. What is the nature of these fugitive stars? Whence do they come? Whither do they go when they disappear from our sight? Do they sometimes fall upon the earth? Such are the principal questions which every one asks himself, and which are of the highest interest.

The much-wished-for fall of one of these meteors would without doubt furnish the chemist and physicist with the means of explaining certain points quite unknown. Those observers also, who were aware of the importance of this inquiry, have not neglected to bestow their attention in this direction, and some of them, in fact, state that they have seen several of these meteors which were projected against the sides of the mountains by which they were surrounded. This fact is undoubtedly of a positive nature, but is it such as to prove the authenticity of the fall of the meteor down to the surface of the earth? Have not the illusions which exercise so great an influence here, and under which observers are more or less placed, contributed to a belief in a projection towards the ground which was apparent only? In support of this suspicion I may be allowed to mention a fact which I had an opportunity of stating more than six years ago in the former series of the Journal of Geneva, in the numbers for March and April, 1830, as follows: A meteor appeared on the 19th of March of the before-mentioned year, at half-past seven in the evening; according to the report of eye-witnesses, it had a round disc, with a well-defined edge, which was almost equal to that of the full moon, and which shed a strong light of a bluish colour; it circulated with great velocity from east to west, and appeared to be at a very great height. Those who observed it at Geneva, and who followed it with their eyes in its horizontal course, thought they saw it burst in the air, and fall in pieces at some paces before them. Other persons, living at the village of Chêne, half a league from Geneva, and who were by chance in the street, being convinced that they had seen it fall on a neighbouring house, ran directly to ascertain whether the building had not been set on fire. This same meteor was also remarked at Saint-Legier, near Vevey, in the canton of Vaud, and on the heights of Fraubrunnen in the canton

of Berne. Those who saw it from this last place, and who followed it for about thirty seconds, agree in saying that it travelled slowly in the direction of the Jura, and that it appeared to them to fall not far from the neighbourhood of Orbe, a small town of the canton of Vaud, thirteen leagues north-east of Geneva. Thus in the three situations, the illusion of the observers was so complete, that in spite of the distance which separated them, namely, in the one case a half league and in the other more than thirteen leagues, they each thought they saw the meteor fall down near them. Such a fact evidently shows that this fall is by no means real, and that if the meteor seemed to descend towards the horizon, this circumstance without doubt is owing to the quick decrease of the angle of sight which measured its apparent height, as the meteor was in rapid motion away from the observers as it pursued its horizontal course.

The appearance of this isolated meteor showed a sufficiently remarkable resemblance to those which for some years past have been seen periodically towards the middle of November, to make it desirable that an opportunity should occur of verifying whether there are any amongst these last which really fall upon our globe.

The night of the 12th to the 13th of November, this year, appeared to me proper for this interesting inquiry, from the meteorological circumstances with which it was attended at Geneva, and which I hastened to avail myself of. Rather thick clouds completely veiled the heavens in a uniform manner; they occupied a very elevated region, where they remained stationary all the night. The temperature was mild, the air calm, and the darkness great, although no fog thickened the transparency of the atmosphere.

The barometer, the thermometer, the hygrometer, the magnetic needle, the ethrioscope and the electroscope were attentively watched at the observatory from seven in the evening to seven in the morning, and their progress marked with care every quarter of an hour*. At the beginning of the observations, at seven o'clock in the evening of the 12th, the barometer reduced to the zero degree marked $725^{mm}.08$, the centigrade thermometer in the open air $+ 7^{o}.8$, and Saussure's hygrometer 87°. At midnight the first of these instruments was at $726^{mm}.95$, the second at $+ 6^{o}.9$, and the third at 93°. On the 13th, at seven in the morning, the barometer marked $729^{mm}.30$, the thermometer $+ 5^{o}.2$, and the hygrometer 98°.

* Two of the instruments, the compass and one of the electroscopes, belong to the Cabinet de Physique of our Academic Museum; these were kindly placed at my disposal, for which my best thanks are due to the directors.

To sum up, I shall say that the barometer, whose progress was gradually ascending, rose in the space of twelve hours of observation $4^{mm}.22$; that the thermometer, whose minimum had been $+5^{o}.2$, varied in the same space of time only $2^{o}.6$; and that the hygrometer proceeded 11° towards humidity. As to the ethrioscope, it did not give (as might be anticipated, with a tranquil and regularly clouded sky) any sign of radiation of heat across the atmosphere. The pith-ball electrometers, placed in the open air, remained motionless; lastly, the magnetic needle presented, at eleven minutes past nine, a slight deviation of $0^{o}.5$ to the east in declination; a deviation which remained the same till a quarter of an hour after midnight, after which it varied, always in the same direction, and till the morning, between $0^{o}.1$ and $0^{o}.7$.

Assisted by three amateurs who wished to join me, a continued lookout was kept, not only towards the region of the east, but in every quarter of the heavens; the terrace of the Observatory commanding the entire horizon.

From seven to ten o'clock in the evening a light breeze prevailed, hardly perceptible, which blew from the north-east; and from ten in the evening till seven in the morning the air remained perfectly calm, excepting at three periods, namely, at two, at forty-five minutes past three, and at fifteen minutes past four, when a light breeze was again perceived, and lasted each time ten minutes.

At forty-five minutes past eight in the evening, and from the south-south-east, a feeble white light illuminated the upper part of the clouds for from three to four seconds. At fifty-one minutes past nine a reddish light, resembling lightning, streaked the upper part of the clouds for nearly three seconds, in the east. At forty minutes after eleven there were white glimmerings, very feeble, which streaked the clouds between the north-east and the south-east; they had a kind of intermitting, and they lasted about six seconds. At thirty-five minutes past one, and directly in the east, there were, in the upper region of the clouds, some lights, in general very feeble, which continued during ten seconds. Lastly, at three minutes past four a white light, less pale, shone for two or three seconds in the elevated stratum of the clouds, in the south-east. But during the whole night, not a single luminous meteor, no shooting star, no aërolite or visible asteroid pierced the clouds to fall in the circle of our horizon. Nevertheless, it is probable that if the sky had not been clouded we should here have very well seen the shooting stars which were observed at the same date in our

neighbourhood, in France and elsewhere; and perhaps the magnificent spectacle which the sky presented at Geneva in the night of the 12th to the 13th of November, 1832, of which Professor Gautier gave an account in the fifty-first volume of the *Bibliothèque Universelle*, might again have been exhibited before our eyes.

The result, then, of our observations is, that the shooting stars circulate in a much more elevated region of the sky than that attained by the clouds, and that meteors of this kind rarely fall to the surface of the earth, if they ever do. This opinion acquires so much more probability, as no one till now, at least so far as I know, has been able to obtain an authentic specimen of this mysterious substance.

A learned astronomer communicated to the Academy of Sciences of Paris, in the session of the 5th of this month (December 1836) a curious and very interesting memoir, which appears to suggest that the luminous nebulosity by which the sun appears to be surrounded in the direction of its equator, a nebulosity which is projected far into space, assuming the form of a cone, and which has been known for two centuries by the name of the zodiacal light, might probably be the source of the myriads of shooting stars of the 13th of November, the earth at this epoch passing in the neighbourhood of the summit of this cone. Nevertheless, the author of the memoir, M. Biot, after having considered the subject under different views and discussed it scientifically, ends by declaring that he neither asserts nor rejects this identity*.

Some writers think that the origin of the shooting stars which compose the periodical phænomenon of the 13th of November, might also be ascribed to a great planet which may formerly have been broken into a multitude of fragments, which would continue to circulate one after the other in an orbit whose position is such that the earth approaches annually very near to it on the 13th of November. These fragments, endowed with a great velocity of projection, would enter our atmosphere at this period, cross it rapidly, and, by the friction caused by the resistance of the air, would grow so hot there as to become incandescent and to send forth a bright light until the moment of their quitting it.

This hypothesis, very ingenious as it may appear, is not free from objection. Already a celebrated philosopher, whose opinion is of great weight, has not hesitated to say that it would be premature to attempt ascending to the physical cause of these curious appearances

* *Comptes Rendus de l' Acad. de Paris,* No. 23, December 1836, vol. iii. p. 665.

until certain matters of fact had been cleared up*; and assuredly M. Arago is right.

It is certain that in one and the same night an innumerable multitude of these meteors have been seen in places whose geographical situation differs 90° in longitude and six hours in time, a circumstance which gives to their appearance a duration of at least 18 hours; our night being at this period more than 12 hours, and beginning 6 hours sooner than in the United States.

Now as in the month of November the earth advances in its orbit 445,500 leagues in 18 hours, a change of place during which the appearances are incessantly succeeding one another, it would be necessary that these meteors, if they really constitute asteroids, should exist by millions in the zone where they appear. But then these heavenly bodies, which should approach so very near to the earth, must frequently fall down upon it, from the attractive power which the mass of our globe would inevitably exercise on them; and this is what has not yet been observed.

When astronomers at the beginning of this century had successively discovered Ceres, Pallas, Juno and Vesta, which revolve around the sun between Mars and Jupiter in orbits which have not a very great eccentricity, the idea of making asteroids originate from the fragments of a planet which might have been destroyed by means of an internal explosion was already put forth; but M. Biot remarked that, with regard to these four telescopic stars, this hypothesis is inadmissible, because, according to the theory of attraction, such an explosion would have necessarily given to these fragments unequal velocities of projection in starting from the same point, whence great unequal axes would have resulted, which is contrary to observation†.

It is known that Professor Brandès proved long ago, by corresponding observations made in different places and often repeated, that there are shooting stars which circulate with a velocity of 13 leagues, of 25 to a degree, in a second, at a height of 180 leagues above the surface of the earth‡. It is also manifest, from the observations made in the United States compared by professor Olmsted, that the centre from

* *Comptes Rendus de l' Acad. de Paris*, No. 23, December 1836, vol. iii. p. 663.

† *Traité Elémentaire d'Astronomie Physique*, 2d. edit., vol. iii. p. 42.

‡ These quantities, on the exactness of which we can rely, are the results of comparative observations begun in 1798 by MM. Benzenberg and Brandés, and continued on a greater scale, in 1823 by M. Brandés and his pupils, at Breslaw, Dresden, Leipe, Brieg, Gleiwitz, &c.—*Bibl. Univ.*, vol. li. p. 203; *Annuaire du Bureau des Longitudes de Paris* for 1836, p. 292.

whence the meteoric shower of the 13th of November of 1833 set out, was elevated at a mean height of more than 800 leagues, and consequently that it was in a region which affords no aliment for combustion. The vivid lustre then which these meteors exhibit, and which they could not borrow from the sun, is their own inherent property. But as in our planetary system we know of no celestial circulating body which shines with its own light, this essential fact, which must necessarily be kept in view, sufficiently shows the propriety, I would almost say the necessity, of considering shooting stars as a distinct class of phænomena.

In bringing together the different data furnished by observation, and in considering the particular circumstances connected with them, we may be led in some measure to conjecture that the source of this singular phænomenon is, perhaps, an electric focus, of which the determining cause is not yet known. But we must bear in mind that, in the region of hypothesis, and especially when we treat of a new subject as yet very little studied, analogy alone, whatever verisimilitude it may appear to possess, is not a basis sufficiently sure to found an opinion upon. I give this idea, therefore, only as a simple inference. It would, besides, be difficult to rank the shooting stars, which are seen unaccompanied with noise, in the catalogue of aerolites, whose fall, which often happens by day, is generally attended by a hissing in the air, by decrepitation, repeated detonations, and a smell more or less intense.

According to a communication made last year to the Academy of Sciences of Paris*, M. Millet Daubenton observed on the 13th of November, 1835, at about nine in the evening, the sky being serene, a luminous meteor, having the appearance of an incandescent globe, which exploded in the air and set on fire a barn covered with wood and thatch, near the chateau of Lauzières, in the department of Ain. M. Millet, according to his own account, is the only observer who saw the immense shower of fire that the meteor formed after bursting. This mere chance, which gave value to his observation, induced him to try if he could not find some stone of an unknown nature near the house and in the surrounding fields, and, indeed, he asserts that he picked up two of the size of a small egg. It is much to be regretted that the Academy after having begged M. Millet to send one of these specimens that they might ascertain its nature and make an analysis

* See the *Comptes Rendus*, vol. i. p. 414.

of it, has as yet kept silence respecting the examination of this meteoric product so interesting by its date.

Although thirty-seven years have passed since the 12th of November, 1799, the time when MM. Humboldt and Bonpland saw, at Cumana, a very unusual appearance of shooting stars which greatly excited their attention, our stock of knowledge respecting the cause and nature of this majestic phænomenon has remained very incomplete.

Without doubt we have yet to bring together many facts, to gather many observations, to arrange them, to discuss them, in order to obtain a definitive solution of the problem. Recently, MM. Olmsted, Arago, Biot and other illustrious philosophers have been occupied with this interesting subject*. They have furnished ingenious ideas and fresh views, by which science will profit. It is true that some diversities are observable in the hypothesis which they have advanced, but these documents are not themselves the less to be prized and preserved. Who knows, but that the light, to the investigation of which every one earnestly applies, may not one day spring from the clashing of opinions?

3.—*On the question whether Shooting Stars are more numerous at certain times than at others. By* M. QUETELET.†

M. Quetelet informed the Academy that during the night of the 12th of November he employed himself at the observatory of the city in noticing the shooting stars, for the purpose of ascertaining, whether in fact, their appearance were more frequent than at another season. His observations presented nothing remarkable as to the number of these meteors.

We remember that M. Arago, in giving to the Academy of Sciences at Paris an account of the results of the numerous observations which

* See the article on shooting stars by Professor Olmsted in the American Journal of Science, or the French translation in vol. iii. of the *Compilateur,* October 1836, page 52; the notices of MM. Arago and Biot in the *Comptes Rendus des Séances de l'Académie des Sciences de Paris,* vol. iii. pp. 560, 629, 663; a notice by Professor Gautier, in the *Bibl. Univ.*, vol. li. p. 189, &c.

† From *L'Institut,* and originally derived from the *Bulletin, de l'Acad. Royale de Bruxelles.*

he had produced in support of this fact, quoted amongst other numbers as being extraordinary, that of 170 shooting stars which the students of astronomy in the observatory of Paris entrusted by him with making observations, had counted during the night of the 13th of November. For appreciating this number, however, and establishing a comparison, facts were wanting, that is to say, the knowledge of the mean number of those meteors which may be observed in a night at any other season of the year. For the purpose of determining this number, M. Quetelet entered upon some investigations relative both to his former observations on shooting stars, and to those of other persons, and he arrived at this result, that the number of shooting stars which are observed, on an average, in an hour, looking constantly towards the same quarter of the heavens, is about eight, and that several observers, placed so as to observe the different regions of the heavens, may count double the number. Accordingly, the number of 170 shooting stars observed at Paris by several persons on the night of the 12th of November would not be at all astonishing; on the contrary, it would come very near to the average number of these meteors which may be observed on a winter's night.

This result of the inquiries of M. Quetelet is important enough for us to give it, supported by all the documents which establish it.

M. Quetelet, before making known the observations which he recorded in 1824, with several other persons, remarks, that in making these observations his object was not to record the number of shooting stars which may be counted in a given time, but merely to bring together the elements necessary for calculating the height, the velocity, and all that has relation to the path of these meteors; it follows, therefore, that the results which they furnish ought to be considered as an under estimate, since many stars were not recorded, because the elements which should have served for their calculation were not sufficiently exact. The same remark must also be applied to the observations made by Benzenberg and Brandés in 1798, the results of which will be given, as well as those made by this last philosopher in 1823, the results of which will also be given.

The observations by Benzeuberg and Brandés in 1798, were made in the environs of Gœttingen. These two philosophers were at first alone, and placed at a distance of 27,050 French feet apart. But after three series of observations they felt the necessity of being further apart, and they placed themselves at the extremities of a base of 46,200 feet, and this time each of them took an assistant to note down

under his dictation the observations, the results of which are brought together in the following table:

1798.	Shooting Stars observed by Benzenberg.	Shooting Stars observed by Brandés.	Number of Hours. Benzenberg.	Number of Hours. Brandés.
Sept. 11.	9	11	2h 0m	2 19m
—— 13.	6	8	1 7	1 36
Oct. 6.	11	13	2 8	2 24
—— 9.	14	63	2 46	8 12
—— 14.	33	123	7 46	7 47
Nov. 4.	62	49	6 34	5 35
Totals ..	135	267	22 21	27 53

Mean number for Benzenberg, about 6 stars an hour.
Brandés, about 10 stars an hour.
Mean number, 8 stars per hour.

The observations by Brandés in 1823 lasted two successive hours; they were made near the time of the new moons, and during the months of April, May, August, September, and October. The results are given in the following table:

Places of Observation.	Shooting Stars observed.	No. of hours.	Mean No. per hour.	Number of the Observers.
Breslaw..........	650	50	13·0	Brandés and his assistants.
Neisse..........	307	30	10·2	Several observers.
Mirkan..........	65	8	8·1	One observer.
Gleiwitz........	356	44	8·1	Two ——
Brieg...........	144	20	7·2	One ——
Trebnitz........	36	6	6·0	One ——
Cracow..........	43	8	5·4	One ——
Leipe...........	36	8	4·5	One ——
Berlin..........	7	4	1·8	One ——
Brechelshof....	26	16	1·6	One ——
Dresden........	40	26	1·6	Two ——

The following are the results of the observations which M. Quetelet made at Brussels in 1824 during ten evenings, together with those made at Liége by MM. Van Rees, and Plateau; and at Ghent by MM. Morren and Manderlier:

Places.	Shooting Stars.	Time.	Mean No. per hour.
Brussels........	155	10h 26m	15·0
Liége...........	42	5 0	8·4
Ghent..........	51	5 30	9·3

After this communication of M. Quetelet, M. Sauveur stated, that being on the road from Brussels to Liége in the night of the 8th of last August, he observed a considerable number of shooting stars, of which several were remarkable for their size and brilliancy.

M. Quetelet suggests that this epoch presents a singular agreement with that of the 10th of August, which the results of observations of shooting stars point out as one of those which are to be remarked for the abundance of meteors of this kind. (See on this subject Brandés's *Untersuchen über die Entfernung und Bahnen der Sternschuppen;* Leipzig, 1825; and Chladni's *Feuer-meteore*, p. 89).

Wishing to aid in throwing more light on this interesting and yet little known branch of meteorology the Academy has resolved to propose for 1837 a series of observations on shooting stars.

4.—*On the Height, Motion, and Nature of Shooting Stars.* *By* M. Quetelet.*

Shooting stars, those meteors so long neglected by philosophers, are beginning at last to engage their attention. We ask ourselves how it happens, that whilst measuring even to the minutest circumstances the motion of those heavenly bodies which are at the extremity of our solar system, and which, by their very distance, escape the attention of the many, greater thought should not have been bestowed on a more careful examination of the nature and cause of the numerous appearances of these meteors, which, infinitely nearer to us, streak every night the surface of heaven, and are sometimes seen in such numbers that the heavenly vault would appear to resolve itself into a shower of stars.

Let us not, however, be in haste to suppose that nothing has been done upon this subject. We might almost be tempted to admit that the sciences also experience the influence and caprice of fashion, and that a certain class of researches can only interest at a certain epoch and under certain circumstances. Shooting stars, which had never been the object of an investigation expressly undertaken, were examined for the first time in a serious manner in 1798, by Benzenberg and Brandés, who examined them during many nights and at many in-

* From the *Annuaire de l'Observatoire de Bruxelles* for 1837.

tervals, with a view to determine their mean height, their velocity, and what belonged to the nature of their trajectory. In 1823, Brandés, seconded by a tolerable number of observers placed in different stations, resumed the same work. At nearly the same time (1824), I undertook, with the aid of from twelve to fifteen persons, similar observations, which were made at Brussels, Ghent, and Liége. I know not whether other regular observations of the same nature have been made since. Only, at my request, seconded by Sir John Herschel, the English scientific men assembled at Cambridge in 1834, thought proper to propose this subject of inquiry in the list of objects worthy to engage the attention of observers. The Royal Academy of Brussels has just come to a similar resolution.

Now, combining the results of the observations made in Germany and in Belgium, the following are the principal conclusions which may be deduced from them.

1. The *height* at which shooting stars appear varies within very wide limits; nevertheless the mean height may be considered as being from 15 to 20 leagues of about 20 to a degree, that is to say, near about the limits of our atmosphere. The two series of observations made in Germany gave :

SHOOTING STARS.

HEIGHT.	In 1798.	In 1823.	Total.
1 to 3 German Miles...	1	4	5
3 to 6	2	15	17
6 to 10	3	22	25
10 to 15	6	35	41
15 to 20	2	13	15
20 to 30	2	11	13
30 to 40	1	3	4
45.7	..	1	1
60	..	1	1
100 and more...........	..	1	1

2. Shooting stars have in general a direction *inclined* towards the surface of the earth. Of 36 computed trajectories, Brandés found 26 descending ones, 9 ascending, and 1 horizontal; 13 formed an angle of less than 45° with the vertical; 14 were between 45° and the horizon; 8 between the horizon and 135°; and only 1 was still more

elevated. With regard to the azimuths, of 34 trajectories, 23 had a direction southwards and 11 to the north, 21 to the west, and 13 to the east. Separating the shooting stars into two groups, we find 25 of them whose course inclines more to a south-west direction, or whose azimuth is less than 135° to the west and 45° to the east, and only 9 are in the other half portion of the heavens. This difference seems to be connected with the direction of the motion of the earth in its orbit, admitting that the meteors in question may be considered as small asteroids.

3. The *brilliancy* of shooting stars is very various; these meteors sometimes surpass Jupiter and Venus in light, and sometimes they are only perceived by the help of finders. Some leave after them luminous tracks visible for some seconds after their passage, which are not to be confounded with those luminous and rapid traces which depend upon the length of the sensation on the retina. The trajectories appear generally as straight lines. Some of them, however, are very sensibly curved; they are far from exhibiting a continued brilliancy in their whole extent.

4. The *velocity* of shooting stars has not been capable of determination with any precision, except for a very small number of these meteors*: it is from 3 to 10 leagues a second.

5. As to the *mean number* of shooting stars which can be observed at any given epoch of the year, after having particularly examined this question† (*Bulletin de l' Acad. Royale de Bruxelles*, vol. iii. p. 404, *et seq.*), I have come to this result, that a single observer or several observers directed towards one and the same region of the heavens can see, on an average, eight shooting stars an hour, and that several observers, placed so as to see the different regions of the heavens, may reckon twice that number of them.

6. It would seem that a cause exists which produces, from about the 8th to the 15th November, more frequent appearances of shooting stars. I have also thought that I remarked a greater frequency of these meteors in the month of August (from the 8th to the 15th).

7. As to the *nature* of shooting stars many doubts still remain on this subject: are they to be considered as asteroids, according to an hypothesis of some standing; or as stones shot from the volcanos

* For six of these meteors whose velocity I was able to calculate, I found 5 leagues, 7·6, 4·5, 3·0, and 3·4, mean 4·7 leagues.

† See the preceding paper.—Edit.

of the moon, according to the opinion of Benzenberg, Chladni, and other physicists* ? I should be inclined to think that a distinction must be made between the shooting stars which leave luminous trains after them, persistent and often characterized by sparks, and those whose course is marked by a trace of light as momentary as the appearance of the star, and which is only owing to the duration of the impressions on the retina. The first appear to me to be really bodies foreign to our earth. The 31st July 1824, I observed an aerolite, or luminous mass, which presented very remarkable circumstances, left sparks on its passage, and must have fallen in the neighbourhood of Antwerp.

[The principle authorities and sources of information on the interesting subjects of shooting stars and the alleged periodicity of certain appearances of them, have been cited in the preceding papers of MM. Wartmann and Quetelet; but we may usefully add a few references in detail to the observations and researches of the physicists in the United States, who have been the first to call attention to the apparent periodical previous appearance and return of the brilliant shower of meteors witnessed in November, 1833.

At present, the recurrence of the *shower of meteors,* as it has been termed, is asserted to have taken place about the end of the second week in November, in the years 1799, 1831, 1832, 1833, 1834, 1835, and 1836. On the other hand, many observers deny that any remarkable or unusual phænomenon of the kind was seen, except in the years 1799 and 1833, affirming that a greater number of shooting stars was observed in the other years (especially in those subsequent to 1833), merely because the attention of observers was specially directed to them at a certain time. The following papers and notices, among others, have appeared in late volumes of Professor Silliman's American Journal of Science and Arts. *On the meteors of Nov.* 13, 1833; by Prof. E. Hitchcock: vol. xxv. p. 354. On the same subject, and on the Meteors of Nov. 13, 1834, and of Nov. 1835; by Prof. D. Olmsted: vol. xxv. page 363; vol. xxvi. p. 132; vol. xxix. p. 168, 377; vol. xxx. p. 370. *Investigations respecting the meteors of Nov.* 13*th*, 1833, &c.; by A. C. Twining: vol. xxvi. p. 320. *Papers*, by Prof. A. D. Bache, *denying that any recurrence of the phænomenon took place in Nov.*, 1834: vol. xxviii; and vol. xxix. p. 383. *An Observation* in

* *Die Sternschuppen sind Steine aus den Mondvulkanen, Benzenberg, Bonn,* 1834.

November 1833; vol. xxvi. p. 397. *An observation* in November, 1835; vol. xxix. p. 390. *Letter from the* Rev. W. B. Clarke, *denying the alleged periodicity ;* vol. xxx. p. 369. A more recent paper by Prof. Olmsted, has been reprinted by Prof. Jameson, in his New Edinburgh Phil. Journal for July last. Prof. Olmsted's first paper contains an extensive collection of observations of the Meteors of Nov. 13, 1833, made in different parts of the United States, and gives various inductions from them. In it also is proposed a theory to explain the phænomena, which is thus finally expressed :—" *That the Meteors of Nov.* 13*th consisted of portions of the extreme parts of a nebulous body, which revolves around the sun in an orbit interior to that of the earth, but little inclined to the plane of the ecliptic, having its aphelion near to the earth's path, and having a periodic time of* 182 *days nearly.*"—Silliman's Journal, vol. xxvi. p. 172.

Some observations on shooting stars, made at Devonport in November, 1836, have been noticed in our last volume, p. 234. Observations of the same period, made at Berlin, Breslau, Frankfort-on-the-Maine, and Gummersbach, will be found in Poggendorf's *Annalen*, vol. xxxix. p. 353—356.

The frequent appearance of shooting stars in August had been noticed in England by Dr. T. Forster (see Phil. Mag., First Series, vol. lxiv. p. 294), and at Pavia, we believe, by M. Bellani.—E. W. B.]—*Philosophical Magazine, &c.*

3.—*Electro-magnetic Motors.*

[This strange and unlooked-for application of Magnetism is now engrossing a large share of attention among scientific men. In the 4th part of the *Scientific Memoirs* are a series of papers on this most curious subject, by Professors Jacobi and Bioto and Dr. Schulthess, of the continent of Europe, and Professor Henry of the United States. Professor O'Shaughnessy of the Medical College at Calcutta, has also put together a model of a machine propelled by this mystic power. Professor Jacobi is sanguine " that the superiority of this new motor, with regard to the absence of danger, the simplicity of the application, and the expense of the materials necessary to keep it in action, is placed beyond doubt." Professor O'Shaughnessy is more confident still in his favorable predications : he says, " I am myself sanguine as to the result; and though I feel that full success in the attempt is beyond my capacity and resources, I confidently expect to *see*, ere long,

the ponderous, expensive and dangerous machinery of steam, rivalled by the light, economical and harmless engines which electro-magnetism will place at our command." Mr. M'Ganley also has made reports on this subject to the meetings of the British Association held at Dublin and Bristol. The mechanical apparatus contrived by the different experimentalists vary considerably. We have selected the following from the *Magazine of Popular Science*, as it offers a concise and simple view of the principles of the subject.—Editor *Madras Journal.*]

Professor Silliman having been invited to examine, and report upon, an Electro-magnetic Machine, invented by Mr. Thomas Davenport, of Brandon, near Rutland, Vermont, gave the subject his attention in March last, and inserted the following description in the number of his Journal which was published in April.

The Machine was exhibited by means of a working-model, in two varieties of form, viz.—

1. *The Rotary Machine, composed of revolving Electro-magnets, with fixed permanent Magnets.*

The moving part is composed of two iron bars placed horizontally, and crossing each other at right angles. They are both five and a half inches long, and they are terminated at each end by a segment of a circle made of soft iron; these segments are each three inches long in the chord line, and their position, as they are suspended upon the ends of the iron bars, is horizontal.

This iron cross is sustained by a vertical axis, standing with its pivot in a socket, and admitting of easy rotation. The iron cross bars are wound with copper wire, covered by cotton, and they are made to form, at pleasure, a proper connexion with a small circular battery, made of concentric cylinders of copper and zinc, which can be immersed in a quart of acidulated water. Two semicircles of strongly magnetized steel form an entire circle, interrupted only at the two opposite poles, and within this circle, which lies horizontally, the galvanized iron cross moves in such a manner that its iron segments revolve parallel and very near to the magnetic circle, and in the same plane. Its axis at its upper end, is fitted by a horizontal cog-wheel to another and larger vertical wheel, to whose horizontal axis weight is attached, and raised by the winding of a rope. As soon as the small battery, destined to generate the power, is properly connected with the machine, and duly excited by diluted acid, the motion begins, by the horizontal movement

of the iron cross, with its circular segments or flanges. By the galvanic connexion these crosses and their connected segments are magnetized, acquiring north and south polarity at their opposite ends, and being thus subjected to the attracting and repelling force of the circular fixed magnets, a rapid horizontal movement is produced, at the rate of two to three hundred revolutions in a minute, when the small battery was used, and over six hundred with a calorimotor of large size. The rope was wound up with a weight of fourteen pounds attached, and twenty-eight pounds were lifted from the floor. The movement is instantly stopped by breaking the connexion with the battery, and then reversed by simply interchanging the connexion of the wires of the battery with those of the machine, when it becomes equally rapid in the opposite direction.

The machine, as a philosophical instrument, operates with beautiful and surprising effect, and no reason can be discovered why the motion may not be indefinitely continued. It is easy to cause a very gradual flow of the impaired or exhausted acid liquor from, and of fresh acidulated water into, the receptacle of the battery, and whenever the metal of the latter is too much corroded to be any longer efficient, another battery may be instantly substituted, and that even before the connexion of the old battery is broken. As to the energy of the power, it becomes at once a most interesting inquiry, whether it admits of indefinite increase? To this inquiry it may be replied, that provided the magnetism of both the revolving cross and of the fixed circle can be indefinitely increased, then no reason appears why the energy of the power cannot also be indefinitely increased. Now, as magnets of the common kind, usually called permanent magnets, find their limits within, at most, the power of lifting a few hundred pounds, it is obvious that the revolving galvanic magnet must, in its efficiency, be limited, by its relation to the fixed magnet. But it is an important fact, discovered by experience, that the latter is soon impaired in its power by the influence of the revolving galvanic magnet, which is easily made to surpass it in energy, and thus, as it were, to overpower it. It is obvious, therefore, that the fixed magnet, as well as the revolving, ought to be magnetized by galvanism, and then there is every reason to believe that the relative equality of the two, and of course their relative energy, may be permanently supported, and even carried to an extent much greater than has been hitherto attained.

2. *Rotating Machine, composed entirely of Electro-magnets, both in its fixed and revolving members.*

It is the same machine that has been already described, except that the exterior fixed circle is now composed entirely of electro-magnets.

The entire apparatus is therefore constructed of soft unmagnetic iron, which, being properly wound with insulate copper-wire, is magnetized in an instant, by the power of a very small battery.

The machine is indeed the identical one used before, except that the exterior circle of permanent magnets is removed, and in its place is arranged a circle of soft iron, divided into two portions to form the poles.

These semicircles are made of hoop-iron, one inch in width, and one-eighth of an inch in thickness. They are wound with copper-wire insulated by cotton—covering about ten inches in length on each semicircle, and returning upon itself by a double winding, so as to form two layers of wire, making on both semicircles about one thousand and five hundred inches.

The iron was not wound over the entire length of one of the steel semicircles; but both ends were left projecting, and being turned inward, were made to conform to the bend of the other part; each end that is turned inward, and not wound, is about one-third of the length of the semicircle. These semicircles being thus fitted up, so as to become, at pleasure, galvanic magnetics, were placed in the same machine that has been already described, and occupied the same place that the permanent steel magnets did before. The conducting wires were so arranged, that the same current that charged the magnets of the motive wheel, charged the stationary ones placed around it, only one battery being used. It should be observed, that the stationary galvanic magnets thus substituted for the permanent steel ones, were only about half the weight of the steel magnets. This modification of the galvanic magnet, is not of course the best form for efficiency; this was used merely to try the principle, and this construction may be superseded by a different and more efficient one. But with this arrangement, and notwithstanding the imperfection of the mechanism of the machine—when the battery, requiring about one quart of diluted acid to immerse it, was attached, it lifted 16 lbs. very rapidly, and when the weight was removed, it performed more than 600 revolutions per minute.

So sensible was the machine to the magnetic power, that the immersion of the battery one inch into the acidulated water was sufficient to give it rapid motion, which attained its maximum, when the battery was entirely immersed. It appeared to me that the machine had more

energy with the electro-magnets, than with those that were permanent, for with the smallest battery, whose diameter was three inches and a half—its height five inches and a half, and the number of concentric cylinders three of copper and three of zinc, the instrument manifested as great power as it had done with the largest batteries, and even with a large calorimotor, when it was used with a permanent instead of a galvanic magnet. With the small battery and with none but electro or galvanic magnets, it revolved with so much energy as to produce a brisk breeze, and powerfully to shake a large table on which the apparatus stood.

Although the magnetization of both the stationary and revolving magnets was imparted by one and the same battery, the magnetic power was not immediately destroyed by breaking the connexion between the battery and the stationary magnet; for, when this was done, the machine still performed its revolutions with great, although diminished energy; in practice this might be important, as it would give time to make changes in the apparatus, without stopping the movement of the machine.

Conclusions.—1. It appears, then, from the facts stated above, that electro-magnetism is quite adequate to the generation of rotary motion.

2. That it is not necessary to employ permanent magnets in any part of the construction, and that electro-magnets are far preferable, not only for the moving but for the stationary parts of the machine.

3. That the power generated by electro-magnetism may be indefinitely prolonged, since, for exhausted acids and corroded metals, fresh acids and batteries, kept always in readiness, may be substituted, even without stopping the movement.

4. That the power may be increased beyond any limit hitherto attained, and probably beyond any which can be *with certainty* assigned; since, by increasing all the members of the apparatus,—due reference being had to the relative proportionate weight, size, and form of the fixed and moveable parts, to the length of the insulated wires, and the manner of winding them, and to the proper size and construction of the battery, as well as to the nature and strength of the acid or other exciting agent, and the manner of connecting the battery with the machine,—it would appear certain, that the power must be increased in some ratio which experience must ascertain.

5. As electro-magnetism has been experimentally proved to be sufficient to raise and sustain several thousands of pounds, no reason

can be discovered why, when the acting surfaces are, by skilful mechanism, brought as near as possible, without contact, the continued exertion of the power should not generate a continued rotary movement, of a degree of energy inferior indeed to that exerted in actual contact, but still nearly approximating to it.

6. As the power can be generated cheaply and certainly,—as it can be continued indefinitely,—as it has been very greatly increased by very simple means,—as we have no knowledge of its limit, and may therefore presume on an indefinite augmentation of its energy, it is much to be desired, that the investigation should be prosecuted with zeal, *aided by correct scientific knowledge*, by *mechanical skill*, and by *ample funds*. It may, therefore, be reasonably hoped, that science and art, the handmaids of discovery, will both receive from this interesting research, a liberal reward.

Science has thus, most unexpectedly, placed in our hands a new power of great but unknown energy.

It does not evoke the winds from their caverns; nor give wings to water by the urgency of heat; nor drive to exhaustion the muscular power of animals; nor operate by complicated mechanism; nor accumulate hydraulic force by damming the vexed torrents; nor summon any other form of gravitating force; but, by the simplest means—the mere contact of metallic surfaces of small extent, with feeble chemical agents, a power everywhere diffused through nature, but generally concealed from our senses, is mysteriously evolved, and by circulation in insulated wires, it is still more mysteriously augmented, a thousand and a thousand fold, until it breaks forth with incredible energy; there is no appreciable interval between its first evolution and its full maturity, and the infant starts up a giant.

Nothing since the discovery of gravitation and of the structure of the celestial systems, is so wonderful as the power evolved by galvanism; whether we contemplate it in the muscular convulsions of animals, the chemical decompositions, the solar brightness of the galvanic light, the dissipating consuming heat, and, more than all, in the magnetic energy, which leaves far behind all previous artificial accumulations of this power, and reveals, as there is full reason to believe, the grand secret of terrestrial magnetism itself.

B. S.

4.—*On the Brain of the Negro, compared with that of the European and Orang-Outang.—By* Dr. FREDERICK TIEDEMANN, *Professor of Anatomy and Physiology in the University of Heidelberg, and Foreign Member of the Royal Society.*

[A Paper under the above title has appeared in the *Philosophical Transactions* of the ROYAL SOCIETY, Part II. for 1836: the following account of it is from the *Magazine of Popular Science.*]

Few subjects have been treated more vaguely and inconclusively than the causes of the alleged inferiority of the negro to the Caucasian race of men, both in respect to physiological structure and mental capacity. The most degraded negro tribes have been assumed as standard specimens of the whole race; and, even with respect to these, the imperfection of organization has been assumed as a proof of mental inferiority; and this, in its turn, as a justification of the white European, in still further degrading them, both mentally and morally, by the most cruel slavery.

Notwithstanding that almost every writer on general physiology has ventured his assertions respecting the negro race, and a few accidental observations have been made on the form and magnitude of the "organ of mind," no one has fairly entered upon the investigation in such a way as to give reason to hope for any general satisfactory conclusion, before Professor Tiedemann. The general opinion has been, as is well expressed by Mr. Lawrence, that "in all the particulars just enumerated [the characters of the Ethiopian variety of man], the negro structure approximates unequivocally to that of the monkey. It not only differs from the Caucasian model, but is distinguished from it in two respects; the intellectual faculties are reduced, the animal features enlarged and exaggerated." The extensive series of observations made by Professor Tiedemann perfectly contradict this assumption; and in order to accomplish this investigation in the most satisfactory manner, he has examined the most celebrated museums both on the Continent and in Great Britain.

The human brain is absolutely larger than that of any other animal, the whale and elephant excepted; although, relatively to the size of the body, it is exceeded by that of the sparrow and many other small singing birds, as well as several of the smaller apes. The superiority, therefore, of the human faculties is not to be sought in the relative or

absolute magnitude of the brain, but in regard, also, to "the bulk and thickness of the cerebral nerves, and likewise to the degree of perfection in its structure." From his researches, Dr. Tiedemann draws the following conclusions :—

"1. The brain of a new-born child is relatively to the size of the body the largest: the proportion is 1 : 6.

"2. The human brain is smaller in comparison to the body the nearer man approaches to his full growth. In the second year the proportion of the brain to the body is as 1 : 14 ; in the third, 1 : 18 ; in the fifteenth, 1 : 24. In a full-grown man between the age of twenty and seventy years, as 1 : 35 to 45. In lean persons the proportion is often as 1 : 22 to 27 ; in stout persons as 1 : 50 to 100, and more.

"3. Although Aristotle has remarked that the female brain is absolutely smaller than the male, it is nevertheless not relatively smaller compared with the body ; for the female body is in general lighter than that of the male. The female brain is for the most part even larger than the male, compared with the size of the body.

"The different degree of susceptibility and sensibility of the nervous system seems to depend on the relative size of the brain as compared with that of the body. Children and young people are more susceptible, irritable, and sensible than adults, and have a relatively larger brain. Thin persons are more susceptible than stout. In diseases which affect the nourishment of the body the susceptibility increases as the patients grow thinner. The susceptibility and sensibility decreases, on the other hand, with persons recovering from a long illness, gradually as they regain their strength. The degree of sensibility in animals is also in proportion to the size of the brain. Mammalia and birds have a larger brain and are more susceptible than amphibious animals and fishes. I propose to go into this subject on another occasion, as it would at present take me too far from my immediate object."

Very few observations have been actually made of the actual and relative weight of the brain of the negro ; and Dr. Tiedemann has, therefore, had recourse to ascertaining the relative contents of the cavity of the skull ; and he gives tables of the results obtained from a number of negro, European, Mongolian, American, and Malayan skulls, thus examined. The general conclusion is, that the cavum cranii of the negro is not relatively smaller than that of the European and other human races.

He then proceeds to show, on the authority of the most intelligent and accurate travellers in Africa, that the general characters and marks of the Ethiopian race usually given, apply only to a very

small, and the most depraved of all the negro tribes, as they have been morally, and thence physically, debased by intercourse with the whites,—those on the coast, and their descendants in slavery.

" These characters are, the skin black ; the hair black and woolly ; the skull compressed laterally : the forehead low, depressed, slanting, and narrow ; the cavity of the cranium smaller, and reduced both in its circumference and in its transverse diameters ; the eyes prominent ; great development of the face, and projection towards its lower part ; the cheekbones prominent ; the jaws narrow ; the superior incisor teeth oblique ; the chin retracted ; the nose broad, thick, and flat ; the lips, particularly the upper one, thick and projecting. This is the countenance of the Mozambique and Guinea negroes, but it is not the feature of the natives of the high lands of Africa. The truth of this assertion is fully attested by the latest African travellers. Winterbottom says of the tribes of Timmanu and Soosoo negroes, in the mountainous districts of Sierra Leone : ' The sloping contracted forehead, small eyes, depressed nose, thick lips, and projecting jaws, with which the African is usually caricatured, are by no means constant traits ; on the contrary, every gradation of countenance may be met with, from the disgusting picture too commonly drawn of them, to the finest set of European features.'

" Tuckey says the same of the Jalaffs or Oualafs ; Meredith of the Fantees ; Adams and Bowdich of the Ashantees, the Dahomeys, and the negroes of the banks of the river Chamba : they have good features, neither broad nor flat noses, nor thick lips. The Mandingos on the banks of the rivers Gambia, Joliba, the higher Senegal, and Niger, as also the Foulahs or Fullahs, and Fellatahs in the interior of Africa, in Bondu, Timboctoo, Housan, Sudan, Bornoo, and Kaschna, vary but little, according to Mungo Park, Denham, and Clapperton, excepting in colour, from the Europeans. Their skin is not so black as that of the negroes on the coast of Guinea, and their black hair is not so woolly, but long, soft, and silky. They have neither broad flat noses, thick lips, nor prominent cheekbones ; sloping contracted forehead, nor a skull compressed from both sides, which most naturalists consider as the universal characteristics of a negro. Most of them have well-formed skulls, long faces, handsome, even Roman or acquiline noses, thin lips, and agreeable features. The negresses of these nations are as finely formed as the men, and are, with the exception of their colour, as handsome as European women.

" Somerville, Barrow, Lichtenstein, and Burchell, have shown that the Caffres and Bachapins, or Betchuanas, have the same form of skull, and

the same high forehead and prominent nose as Europeans. Credible travellers and accurate observers comfirm also what the celebrated Blumenback said thirty years back, ' that the exterior of negroes gradually approaches to that of other races, and acquires by degrees their fine features.' "

The author then examines the spinal cord and medulla oblongata in the European and negro subject, and finds no remarkable difference, except that which arises from the different size of the bodies he examined. He afterwards examines the cerebellum of the negro, which he finds, with regard to outward form, fissures, and lobes, to be exactly similar to the European. The cerebrum is next examined. The general external character was the same as in the Caucasan ; the differences being chiefly in the greater or less development of some particular portion of the structure, probably not greater in any case than may be found amongst Europeans themselves ; and in the internal structure he did not observe any difference so as to render special description of the negro necessary or desirable.

The next question examined is, whether the nerves of the negro are thicker than those of the European, or, in other words, the brain less in comparison with the quantity of nerve? This he decides in the negative.

Lastly, his inquires are directed to the question, " Has the brain of the negro more resemblance to the Orang-Outang than to that of the European ?" He finds the following results :—

" 1. The brain is absolutely and relatively smaller and lighter, shorter, narrower, and lower than the human brain.

" 2 The brain is smaller in comparison to the size of the nerves than in man.

" 3. The hemispheres of the brain are, relatively to the spinal marrow, medulla oblongata, the cerebellum, corpora quadrigemina, the thalami optici, and corpora striata, smaller than in man.

" 4. The gyri and sulci of the brain are not so numerous as in man.

" The hypophysis and the origin of several nerves are wanting. By comparing the negro brain with those of the orang-outang, we shall find the same difference as between the brain of the European and the orang-outang. The only similarity between the brain of the negro and that of the orang-outang is, that the gyri and sulci on both hemispheres are more symmetrical than in the brain of the European. It remains, however, to be proved whether this symmetry is to be found in all negro brains, which I very much doubt. The size and quantity of the brain of the negro varies as much as the European from that of

the orang-outang. I measured the capacity of the cavum cranii of a full-grown Asiatic pongo, and found that it only held 11 oz. 7 dr. The brain of this pongo was therefore much smaller than is usual, even in congenital idiotism."

His remarks on the intellectual characters of the Ethiopian race are worthy of the attention of every man who has a single grain of philanthropy in his bosom, or of science in his mind. It is at length made evident that the views which have been entertained by those who advocated the amelioration of the negro race, as to their capability of civilization and of intellectual and moral culture, are borne out by the structure and character of the "organ of mind;" and we trust the labours of Professor Tiedemann will have some influence on even our transatlantic brethren, as well as upon the conduct of the European governments generally. Those who advocate negro slavery, either in opinion or in practice, have now not a single argument left them, save the demon-like one, that "might is right."

5.—*Method of transporting Exotic Plants.*

[The following clear account of the method of transporting exotic plants from distant countries in a living state, proposed by N. Ward, Esq., of Wellclose-square, is translated from the instructions written for the expedition in the *Astrolabe* by M. de Mirbel, and will serve to elucidate the somewhat meagre report made on this subject at the late Liverpool meeting.]

Another apparatus for the carriage of plants, invented by Nathaniel Ward, Esq., of London, presents a still greater chance of success than that of Luschnath*; but it only fulfils its object, provided it remains exposed to the full action of light during the voyage, and is not too much shaken. This apparatus consists in a long box, surmounted by a glazed roof, formed of two frames, adjusted so as to meet at an acute angle. The two ends of the box extend two or three inches below the bottom, and serve as feet to the apparatus, and are also continued above the sides, and are formed into an acute angle, to close the ends left open by the sloping roof. One of the frames is fixed, the other is

* Thus in original; it is the name of an English gardener, but there must be, as usual, some strange mistake in the spelling.

secured in its place by screws, and may be removed at pleasure, but it should be made to close the box accurately as long as the voyage lasts, for this perfect air-tightness of the apparatus is essential to success. The frames are divided into compartments for glazing by bars, half an inch broad, and 1½ to 2 inches apart, the glass being in small pieces, very thick, and closely joined together with mastic at the overlaps.

To prepare this chest, the moveable light is taken out, and the bottom of the box covered to a depth of half an inch or more, with moistened, well-tempered clayey earth, hard beat down, but not decidedly wet. On this substratum is laid earth of a good quality*, neither too stiff or too light, but well mixed. The plants are placed in this soil, some with their roots naked, others having a clod of their native soil attached, which clod should be bound up in dry moss with bass or packthread, and some in pots buried in the earth.

Thus arranged and left to themselves, the plants secured from drought or humidity, will travel for long periods, undergoing changes of latitude and climate, without being sensibly affected in their health. They are, in fact, in a torpid state during the voyage, and their nutrition and exhalations seem to be equal, respiration continues, and the herbaceous parts preserve their colour, but they do not sensibly increase in size.

For some years past, interchanges of plants made on this plan between Calcutta and London, have succeeded beyond all hopes. The Messrs. Loddiges, who possess at Hackney the richest nursery in Europe, are continually sending out to New Holland, Van Diemen's Land, the East Indies, &c., empty boxes of this description, which are returned to them full. The administration of the *Museum de l'Histoire Naturelle* has just received, for the first time, one of these chests, for which it is indebted to the enlightened courtesy of Dr. Wallich, director of the botanic garden at Calcutta. This box contained fifteen precious species, which hardly appeared more exhausted than the plants taken out of our frames on the return of summer, and yet the voyage must have lasted eight or nine months. The administration sent Dr. Wallich, in return, in a box made on the same plan, plants from the south of Europe, and from the hot regions of America; and, following the example of the Jardin du Roi, the family Cels, whose hereditary zeal for the introduction of exotic plants into France is known to all the world, has also forwarded another case to Dr. Wallich similarly furnished.—*Magazine of Popular Science, &c.*

* It should be peat or bog earth.—*(Editor.)*

5.—*Hindu Inscriptions.—By* Walter Elliot, Esq., *Madras Civil Service.—Re-published (with the corrections and emendations of the* Author) *from the* Journal *of the* Royal Asiatic Society, No. VII.

I beg to present to the Royal Asiatic Society two MS. volumes, containing copies of 595 Inscriptions, collected, during a period of eight years, in the southern Mahratta country, or the district of Dharwar ; in the western part of the Nizam's territories ; in the northern district of Mysore ; and from the province of Sunda, comprised in the Mangalore collectorate.

Most of these are engraved on great slabs of stone, generally formed from a compact black basalt, which takes a fine polish, and seems particularly adapted for resisting the influence of the weather. Sometimes the slabs are of clay slate, or (particularly to the N. E.) of a small schistose limestone, more liable to injury and erosion. Others, again, are cut on the pillars of temples, or on their exterior walls, as on the sandstone temples of Eiwally* or Eiyaholla ; and a very few are taken from deeds engraved on sheets of copper, that had been long in the earth, and had accidentally been brought to light. Several have been procured from monumental stones recording the death of warriors, or the incremation of sattis ; the latter are frequent in the S.W. portion of the Dharwar district, and in Mysore, and display rudely-sculptured representations of the scenes recorded. The plain slabs have generally a few symbols engraved above the commencement of the inscription. In the right corner is the sun, in the left the moon. Below the sun is sometimes found the peculiar ensign or symbol of the party making the grant. Thus, the Chalukyas carry the figure of a boar, which was their signet, or ensign ; and the Yadavas are often distinguished by the representation of a crooked knife, or dagger. Underneath the moon is a cow and calf, which were always presented to the Brahmans on the occasion of grants being made. In the centre is the chief object of worship of the granter. The Chalukyas, being followers of Siva, have the Lingam in this situation, with an officiating priest on the one side of it, and a votary on the other; the Kalabhuryas, a sitting Jain Tirthara, with attendants, &c. But most of the grants having been made by individuals of humbler rank, they represent some symbol peculiar to them, together with the Ling, or a Jain deity. A grant by a zemin-

* A village on the banks of the Malpurba river.

dar of the Nagavansa at Bheiranmati, near Bagalkotah, in Saka* 912, exhibits, under a representation of the sun, a cobra di capello snake, with the hood expanded, a Lingam in the centre, and the cow and calf under that of the moon.

The language employed is for the most part Sanskrit, arranged in slokas of different metres, and containing a considerable mixture of ancient Kanarese words and phrases, many of them now obsolete. Sometimes the Kanarese tongue predominates much more, and a few are entirely in that dialect. The monumental stones are invariably Kanarese.

It was not until I became possessed of a great number of these inscriptions, and endeavoured to arrange them chronologically, that I derived any useful results from them. I then perceived that they contained historical facts of considerable importance, together with notices of ancient manners and customs, particularly regarding rights of property and tenures of land, of a very interesting nature. The present paper is confined to a notice of the historical data, as far as they have been made out.

The first object was to make a *catalogue raisonné* of the whole collection, a copy of the most useful portion of which is transmitted, serving as an index, or table of contents to the volumes themselves. But in accomplishing this, several difficulties presented themselves. The inscriptions all commemorate grants of land, money, or the transfer of seignorial rights to temples, gurus,† or religious establishments, or for the preservation of tanks, and public works. Some of these are dated from the Saka year in which they were made, but a great number record only the Samvatsara, or year of the cycle (the Vrihas patí yuga), of sixty years, which, in a period extending over some centuries, indicates no definite epoch. Others, again, merely state the year of the king's reign, or that of some petty æra introduced by a sovereign of the time, ambitious of perpetuating his name by founding a new Saka of his own.

By comparing the whole of these together, however, and making use of such as had the Samvatsara and the Saka years both mentioned, all the other cycle years in the series before and after the ones specified were arranged in their proper places. The results were so satisfactory, and tallied so well with each other, as to establish the conviction that the arrangement now offered must be very nearly correct. By

* This Saka, or, as it is commonly called, Salivahana Saka, or Era of Salivahana, commenced A. D. 79.

† Guru, a family priest, one of a particular sect or order.—Edit.

the same means, also, certain names of different princes were identified with particular titles adopted by them. In some inscriptions they are designated by one title, and in others by a different one, having all reference to the same, though at first appearing to point out different individuals.

Some difficulty was likewise experienced in the obsolete characters employed in the earlier inscriptions. An alphabet of such of these forms as were deciphered, was prepared by the Kanarese copyists in my service, which was printed at the Bombay lithographic press, for general distribution. A few copies accompany this paper.

The inscription so arranged are found to relate to four dynasties of princes, reigning over the greater portion of that part of India now denominated the Dakshana, or Dekkan, but at that time Kuntala desa. The capital was first Kalyan (in the Muhammadan province of Kalbarga), and subsequently Devagiri, now the modern city of Dowlatabad. The limits of this kingdom appear to have been the Nermada, or Nerbudda, on the N.; the Ocean on the W.; the line formed by the Kanarese language on the S. E., which includes part of the Bellary collectorate; and on the S. W. they would include the provinces of Naggar, or Bidnur, and of Sunda. The best defined natural line is, the course of the Krishna, and Tungabhadra; but many inscriptions, particularly of the Devagiri princes, have been obtained considerably to the south of the latter river. The eastern boundary I have not been able to ascertain, but it is probable that it did not extend beyond the Ghats, under which lay the kingdoms of Kalinga and Andhra, which are both mentioned as occasionally hostile to Kalyan. I have procured records throughout a considerable portion of the limits above stated, as far as the Godavery N., and Kalyan E., and from the frequent contests mentioned in them with the princes of Gurjara, Malwa, Kalinga, Chola, &c., I conceive them to be pretty correct.

The term Karnataka desa, is likewise used to designate this tract in the later inscriptions. The Karnataka province would seem to be more naturally marked out by the range of the Karnataka language, which would both fall short of the extent of the Chalukya sway on the N., and likewise carry it too far to the S.; to places where there is no record of their authority having ever reached. The boundary of the Kanarese tongue on the W. and N. may be designated by a line drawn from Sadaseoghur, on the Malabar coast, to the westward of Dharwar, Belgaum, and Hukairi, through Kagal and Kurandwar, passing between Keligaon and Pandegaon, through Brahmapuri, on the Bhima, and Sholapur, and thence east, to the neighbourhood of

Beder. From Sadaseoghur, following the southern boundary of Sunda to the top of the western Ghats, it comprehends the whole of Mysore as Koimbatur, and the line of eastern Ghats,—including much of the Chola and Belala kingdoms, and even Dwara Samudra, the capital of the latter, which was never subjugated by the Chalukyas. On the other hand, distinct evidence exists of their having possessed nearly the whole of Maharashtra. The Maha Mandaleswar, or hereditary chief of Kolapur, was one of their chief feudatories, and Vikram Chalukya II. is recorded to have married the daughter of the Mandaleswar, or Zemindar of Mangalwehra, besides other notices of the Nermada, as being their northern limit.

The period more immediately embraced by these dynasties is from Saka 895 (in which the principal one, that of the Chalukyas, recovered its power, which had been subverted some time before), to Saka 1234, when the Yadavas of Devagiri were overthrown by the Muhammadans. But proofs have likewise been obtained of the possession of sovereign authority by the Chalukyas at a much earlier epoch, commencing about the fifth century of the Salivahana æra.

The following is a tabular statement of the princes that reigned during the best authenticated period:

I. CHALUKYA DYNASTY.

NAME.	TITLE.	Began to Reign — Saka.	Ceased to Reign — Saka.	Duration of Reign.	Aver. length of Reign.	
1. Teilapa Deva......	....	895	919	24		These dates are only approximations, deduced from the earliest & latest inscriptions of each prince that have been found; the whole doubtful period is seventy nine years, giving an average of nearly sixteen years to each reign.
2. Satya Sri, or Irivi Bhujanga Deva.....	....	919	930?	11?		
3. Vikramaditya I, or Vibhu Vikram..	....	930?	940?	10?		
4. Jaya Sinha Deva	Jagadeka Malla...	940?	962?	22?		
5. Someswara Deva I..........	Treilokya Malla Ahawa Malla...	962?	991?	29?		
6. Someswara Deva II., Soyi Deva, or Sovi Deva..............	Bhuneka Malla ...	991?	998	7?		
7. Vikramaditya II., or Kali Vikram, or Permadi Raya.........	Tribhuvana Malla	998	1049	51		
8. Someswara Deva III..........	Bhuloka Malla ...	1049	1060	11		
9............................	Jagadeka Malla ...	1060	1072	12		
10. Teilapa Deva II., or Nurmadi Teilap........	Treilokya Malla.	1072	1104	32		
11. Someswara Deva IV..............	Tribhuvana Malla	1104	1111	7		
		Total years......		216	$19\frac{7}{11}$	

II. Kalabhuriya, or Kalachuriya Dynasty.

NAME.	TITLE.	Began to Reign. — Saka.	Ceased to Reign. — Saka.	Duration of Reign.	Aver. length of Reign.	
12. Vijala Déva, or Bijala	Tribhuvana Malla	1078	1087	9		
13. Morari Sovi Déva or Vira Vijala, or Soméswara Déva	Bhuneka Malla.	1087	1098	11		These titles are rarely used.
14. Sankama Déva.	Ahawa Malla.	1098	1104	6		
		Total Years		26	8$\frac{2}{3}$	

III. Yadava Dynasty of Dwara Samudra, or Hoisala Bellalas.

NAME.	Began to Reign.	Ceased to Reign.	Duration of Reign.	Aver. length of Reign.	
15. Vira Bellala.	1113	1133?	?	...	There is only one inscription of his time, in Saka 1115.
16. Narasimha	?	?	?		

IV. Yadava Dynasty of Devagiri.

NAME.	Began to Reign.	Ceased to Reign.	Duration of Reign.	Aver. length of Reign.	
17. 1. Ballam Déva.	1110	1115	5		
18. 2. Jayatuga Déva, or Jaytuk Dev, or Jyt Pal Dev.	1115	1132	17		The exact year of his death, and of his successor's accession, has not been ascertained.
19. 3. Simhana Déva.	1132	1170?	38	....	
20. 4. Kandarae Déva, or Kanera Déva..	1170?	1182	12		
21. 5. Mahá Déva.	1182	1193	11		
22. 6. Ramachandra.	1193	1232	39		
23. 7. Shenkar Déva	1232	1234	2		
				17$\frac{5}{7}$	or nearly 18 years.

OF THE CHALUKYAS.

This is the oldest race of which we find satisfactory mention made in the records of the Dekkan. They seem to have belonged to the great tribe that, under the general name of Rajpúts, exercised dominion over the whole of Northern and Central India. It seems doubtful whether the name Chalukya occurs in the catalogue of the thirty-six royal races, but Colonel Tod has identified them with the Solankis, who are included in that enumeration, and who for a long time ruled over Anhalwara Pattan, in Gujarát. The Solankis, however, were one of the four Agnikulas, whereas the Chalukyas always profess themselves of lunar origin. And it is remarkable, that in none of the inscriptions quoted by Colonel Tod, do they style themselves Solankis, but always Chalukyas.* Nor does the former title ever occur in any of the present inscriptions. Indeed, there is every reason for believ-

* Ann. of Rajn. vol. i., Appendix IV. and VI. pp. 801—4.

ing, that the two powerful dynasties of Gujarát and the Dekkan had a common origin.*

The accompanying tree shows the genealogy of the Chalukya family for twenty-four generations, and extends over a period reaching from the fifth to the thirteenth century of the Salivahana æra. Nearly the whole of the present collection of inscriptions, however, are subsequent to the restoration of the family, in the person of Teila, in Saka 895. The names anterior to that prince are given on the faith of two inscriptions,† which profess to be taken from older inscriptions, on copper plates then extant. Such evidence, from the universal anxiety of all men to exalt the source from which they derive their origin, would have been insufficient to admit their claim to regal power antecedent to the dates shown in the great body of inscriptions; but, fortunately, some of these copper deeds have themselves come to light. One of them, found at Kurt-Kotah, in the Dambal Parganah,‡ I have now the honour of presenting to the Society. It consists of two plates of copper, united by a ring, on which is engraved the figure of a boar,§ the distinctive symbol or seal of the Chalukyas. These plates are inscribed on both sides with characters of the Hala-Kanarese alphabet, and refer to a grant made by Vikramaditya, the eighth from Jaya Sinha, in Saka 530. Two others were given to Captain T. B. Jervis, Bombay Engineers (who kindly allowed me to copy them), by Chintaman Row Patwardhan, the chief of Sangli, in whose Jagir they were found; and three more, on stone, were met with in an old Jain temple, at Lakmeswar, all belonging to the earlier dynasty; together with a renewal of an older grant, existing at Aminbhavi, near Dharwar.

From these authorities we learn the following facts : Jaya Sinha claims to be descended from ancestors previously enjoying royal power,‖ of whom fifty-nine reigned in Ayodyapura and other places,

* Ann. of Rajn vol. i., Appendix p. 97.

† 1. At Ye-ur, in the Nizam's territory, No. 4 of Vikram II., p. 166 of MS.—2. At Handarki, in Tondur, Nizam's territory, No. 141 of Vikram II., p. 402 of MS.

‡ It was dug up in repairing the house of the Kulkurni, or village accountant, in 1827.

§ This device was subsequently adopted by the kings of Vijayanagar. Lands are still held, on similar metallic deeds, granted by them, and bearing the same effigy on the seal.

‖ Ye-ur, App. No. 1. The Jain Guru of the Malkheir Simhasanam gave the following traditionary account of the ancestors of Jaya Sinha,—that they were descendants

GENEALOGY OF THE CHALUKYA RACE OF KALYAN.

Jaya Sinha

Rana Ragaha, or Rájá Sinha ?

Pulakesi—was reigning in Saka 411

1. Kirtthivarma
   - Satya Sri, from whom the family take the title of Satya Sri Kula, was reigning in 488 Saka
   - Amara
   - Aditya Varma
   - Vikramáditya—began to reign Saka 514
   - Vinayádita, surnamed Yudha Malla
   - Vijayáditya—began to reign Saka 617

2. Mangalisa
   - 0

Sons of Vijayáditya:

1. Vikramáditya—began to reign Saka 655
   - Kirtthivarma
   - 0

2. * * * * * * *
   - Kirtthivarma
   - Teilapa
   - Bhima Rájá
   - Eiyana
   - Vijitáditya, married Bonta Dévi, daughter of Latchmana Raja of the Bhedivansa
   - Teila Bhupam Vikramáditya, married Jakabya

Sons of Teila Bhupam Vikramáditya:

1. Satya Sri, married Ambika Dévi
   - 0

2. Dasa Varma, married Bhagavati Dévi

Sons of Dasa Varma:

1. Vikramáditya I.
   - 0

2. Eiyana
   - 0

3. Jaya Sinha, Jagadek Malla
   - Soméswara Deva I., Treilokya Malla, Ahawa Malla

Sons of Soméswara Deva I.:

1. Soméswara Déva II., Bhunek Malla
   - 0

2. Vikramáditya II., Kali Vikram, or Vir Permadi Raya
   - Soméswara Deva III., Bhulok Malla

Sons of Soméswara Deva III.:

1. * * * * * Jagadek Malla
   - 0

2. Teilapa II., or Nurmadi Teila, Treilokya Malla
   - Vir Someswar IV., Tribhuvana Malla.

in the north, or in Hindustan; and among these are specified the names of Vishnu Verdhana, Vijayaditya, and Satya Sri. Sixteen are then described as reigning after him, in the Dekkan, or South country; but previous to them, two other families or races had possessed it, the Kartas* and the Rattas, the latter of whom were overthrown by Jaya Sinha, who defeated and destroyed Krishna, the Ratta Raja.†

His son was Raja Sinha, surnamed, from his warlike qualities, Rana Ragaha. The name, Raja Sinha, occurs only in one place,‡ and may, perhaps, not be correct; but his title appears repeatedly.

The son of the preceding, Pulakesi, appears to have been a prince of great power. One of the copper deeds, in the possession of Captain Jervis, records a grant made during his reign, in Saka 411. He is described as "having performed the Aswamedha sacrifice; as plunging among the hosts of his enemies, mounted on his horse Chitra Kanta; as reigning from the Ganga to Setu; his standard floating to the Ganga and the Yamuna, Lord of the Single Canopy (eka chatra adipati), and imposing his orders on the mighty chiefs of Chol, Kerala, Kalinga, Simhala, Bhupal."§

of the kings of Delhi, from whom sprang Hema Syn, who came to Darmapur, forty kos from Hyderabad, and married the daughter of the chief of that place. His son, Dharma Pal, married the daughter of the Rajah of Chikodi (near Kolapur), and built the fort of Bagalkotah (on the Ghatpa or Ghatparba river), whence he derived the title of Bagarasu. He afterwards settled at Sivagam, near Aurungabad, and made himself master of Sarrar-shapur, beyond the Godaveri; and finally he built, and settled himself at Nagavi, near Malkheir. His son, Chittra Datta, or Chitr Syn, removed to Chitapur, three kos from Nagavi, on account of the badness of the water, and built Malkheir, or Mahipati Nagara; the old name of which was Maliyadra. Subsequently they removed to Kalyan, changing its name from Belgola, to its present denomination. But this account is too vague to be deserving of much credit.

In one of the inscriptions the origin of the family is deduced from "Brahm, Manusputra (or Atri), Mandavi or Mandarvya, Hariti, Hariti Pancha Sikha, who was making a libation to the sun, at the Sri Sanddhya, when the Chalukyas sprang from the spray of the water poured out. In this race were born Vishnu Verddhana, Vijayaditya, and Satya Sri, Lord of Ayodya, &c."—Handarki Ins. p. 402.

In another, the descent is brought from Brahma, through Budha and Ila, to Paruravas, "from whom came Hariti the five-tufted, making illustrious the Somavansa, and progenitor of many royal races, conspicuous among which was the Chalukya vansa, in which was born Satya Sri, the lord of Ayodya, from whom the race was denominated the Satya Sri Kula."—Ins. at Ittagi, No. 86 of Vik. II., p. 319.

* Ins. at Handarki, p. 402. † Ins. at Ye-ur, App. No. I.

‡ Captain Jervis's copper Sasana.

§ Copper Sasana. The grant is made by Sivunda of the Nilasandra Vansa, servant of Satya Sri Pulakesi, who appointed him governor of the Kukundi dés of 700 villages, in

The Ye-ur inscription styles him lord of Watapipura; and another, at Barungi, in Mysore, relates that, "among many former celebrated Rajas, was Pulakesi. He burned Kanchi, the capital of Chol, who in return destroyed Kalyan, which Pulakesi no sooner heard, than, mounting his elephant, he attacked Chol and killed him."*

The brothers Kirtthivarma and Mangalisa, severally followed their father Pulakesi; and the succession was then continued in the elder branch, by Satya Sri, son of Kirtthivarma. He is said to have been celebrated for his virtuous qualities (Satya), and it is added, that from him his descendants adopted the title of Satya Sri Kula. But we find the same title adopted as a generic appellation by his grandfather, Pulakesi, and it is likewise enumerated among the names of those princes who had previously reigned in the North.† We also find it assumed by many of his successors, while others prefer that of Vikramaditya, or Vikram.

His æra is fixed by an inscription at the small village of Aminbhavi, four or five miles from Dharwar, which shows that he was reigning in Saka 488.‡

The next names on the list are Amara, Aditya Varma, and Vikramaditya. A copper grant presented to the Royal Asiatic Society is of the time of the last mentioned prince. It bears date, the thirty-second of his reign, Saka 530, and his accession is thus fixed as having occur-

one of which, Alakta nagara, producing rice, sugar, cloves, nutmegs, he built a Jain mandapa, by permission of the Satya Sri, and endowed it, &c. The date is expressed thus: "Sak' abdeshu ekadasutreshu chatu seteshu vibhuva Samvatsara." This gives Saka 411, but Vibhuva is 410; a difference of *one* year, however, between the inscribed date, and that calculated from the present time, occurs in several other places.

* Ins. No. 103 of No. VII., p. 352 of MS. I am not acquainted with the site of Watapipura. Many of the great families are styled lords of some great city, as the Kalabhuryas of Kalanjra, and the Silaharas of Tagara, which have no reference to their existing localities.

† See App. No. I.

‡ It records the renewal, of a grant in the time of Tribhuvana Malla Vikram (one of the later Chalukya princes, subsequent to Teila), to the Sri Mulasthan Kali Deva temple, by Ananta Palarasu Danda Nayaka; which grant had formerly been made by, or in the time of Satya Sri, son of Kirtthivarma, son of Pulakesi, then reigning or residing at Kesuwalala, (the modern perhaps ?) Kusanur on the banks of the Malapahari river, in Saka 488, Servajit Samvatsara. The date is given disinctly in figures, and, as in the former instance, the cycle year corresponds within one of he calculation made from the present time, Servajit thereby being 489. The renewal of, the grant is made by Ananta Pal chief of the Palsagi 12,000 (villages understood). The different jurisdictions or territorial divisions, are always expressed in this manner. Palsagi is the modern Parganah of Halsi, in the Bidi Taluk.

red in 515* In another place he is called "the disturber of the Rajahs of Pandya, Chola, and Kerala, and of the Kadamba Kula," and is described as making the Kanchipati (or lord of Kanchi, the capital of the Cholas), kiss his lotos feet.†

Yudha Malla, a title equivalent to that used by some of the later princes, of Ahawa Malla, succeeded his father Vikram. His name occurs in one of the Lakmeswara inscriptions, and appears to have been Vinayaditya Satya Sri, "who churned the lords of Kanchi, and of Singala Dwipa, as the son of Siva destroyed Taraka."‡

The æra of his son Vijayaditya is fixed by the inscription just quoted, which is dated Saka 651, in the thirty-fourth of his reign, thus determining the year of his accession to be Saka 618.§

A second inscription in the same Jain temple was made in the time of the son and successor of Vijayaditya, named Vikramaditya. In it Saka 656 is stated to be the second of his reign; thus giving Saka 655 as the year of his accession, and ascertaining the duration of his father's reign to have been thirty-eight years.||

No records have been obtained of any of the succeeding names in the list, till the time of Teila. It appears indeed, that previous to the æra of that prince the power of the Chalukyas was alienated for a time, or had suffered a partial obscuration; for he is described as having recovered his hereditary dominions, by again subduing

* Copper Sasana. Deducing his genealogy from Pulakesi, it continues :—"In trinsutar pancha sateshu, Saka varsha (or 530), on the eighth day of the sixteenth royal victorious year (Vijaya raj Samvatsara), on occasion of a solar eclipse, the king Vikramaditya and his queen having bestowed certain gifts, the chief Senipati, or general, son of the Sachiva, or minister, at the same time being in presence of the king, washed the feet of Rava Sarmana, son of Madhuva Sarmana, and bestowed on him the village of Kurt-Kotah, &c." The grant was found in digging the foundations of the Kulkurni's (or village record keeper's) house, of this place. The titles of the priests, *Sarmana*, are remarkable, as indicating sectaries of the Buddha faith.

† Ins. at p. 1 of the MS.

‡ Ibid.

§ Ibid. The genealogy is given thus: "Vijayaditya, son of Vinayaditya, son of Vikramaditya, Satya Sri." The date is, eka pancha shat utra shatashateshu, Vijaya raj Samvatsara chatur trimshetu. The rajah, having taken instruction from his Guru (Swaguru) Niravidya Pundit Yatipati, the disciple of Udaya Deva Pundit, &c., the "destroyer of other creeds," (para matha), gave one-eighth of the village to the Jinendra of the Shenkh vasti of Pulikara Nagara. Pulikara Nagara is the ancient name of Lakmeswar.

|| Ins. p. 7. It records a grant of 100 Gaviyotis (an obsolete measure of land), to the Jina Deva of Ramacharya, in the Shenkh vasti, a white Jinalaya of Pulikara Nagara. The date is, pancha shat'utra shatashiteshu saka varsheshu vetiteshu Vijaya raja Samvatsara pravartamana dwitya.

the Rattas, who seem not to have been entirely extirpated by Jaya Sinha, but to have grown again into power, or to have obtained a temporary advantage over their conquerors.

A fact mentioned by Colonel Tod, affords some confirmation of this supposition. "It was," he says, "in Samwat 987 (corresponding with A. D. 931, and with the Salu Saka 853), that Bhoj Raja, the last of the Chawaras, and the Salic law of India, were both set aside to make way for the young Moolraj, who ruled Anhalwara for the space of fifty-eight years. He was son of Jeysing Solanki, the emigrant prince of Calian, who married the daughter of Bhoj Raj.*"

Allowing a period of twenty or thirty years to have elapsed previous to the accession of Moolraj, the revolution which drove the Chalukyas from the throne may be placed in the third or fourth generation previous to Teila, or about Saka 820. Though the name Jaya Sinha does not occur in the genealogical catalogue, he may have been one of the royal family, who sought the then famous court of Anhalwara, to repair his fortunes; or, as many of those in the list have two or more names, and titles besides, he may have likewise been known by some other appellation.

The fact, however, seems indubitable, that the Rattas gained the ascendancy for a time, till they were again finally reduced to subjection by Teilapa.

On a review of the preceding statement, though the different data appear to confirm each other in so many instances, we cannot but remark that the period of time supposed to be occupied by the descendants of Jaya Sinha much exceeds that which probability warrants. The first date that has been obtained, is that of Pulakesi, which appears to be Saka 411. From that year to the accession of Teila, in 895, a period of 484 years is embraced, in which are found fifteen names; thus giving an average of thirty-two and a half years to each reign,—a duration evidently greatly beyond probability. From Pulakesi to Vikramáditya, in Saka 655, are nine names, and 244 years, affording an average of twenty-seven years to a reign; and the same result, nearly, is obtained by extending the calculation to the final extinction of the family, in 1111, a period of 700 years, containing twenty-seven names, with an average of twenty-six years and a third to each reign; none of which are warranted by analogy. A reference to the Table of Dynasties at p. 4, shows that the later Chalukyas, including one reign of fifty-one

* Ann. of Rajasthan, i. 97, 8.

years, averaged only nineteen and a fraction years each; and the Yadavas, a fraction less than eighteen. Assuming this average as a basis, we cannot assign to Jaya Sinha an earlier date than Saka 572; nor to Pulakesi, one beyond Saka 610.

The only solution of the difficulty that offers is, to suppose that the æra of Pulakesi has not been rightly ascertained. But then the mistake must be continued through the whole of the succeeding dates, which tally with each other in a way that affords the strongest presumption of their freedom from any material error. The complete genealogy only occurs on a stone at Ye-ur, purporting to have been copied from an older copper Sasana. It states, however (and it is confirmed by another stone at Handarki), that "sixteen reigned after Jaya Sinha," and accordingly we find that number occurring from Rana Ragaha to Teila, who began a new epoch. A slight doubt, however, occurs in two places: 1st. Whether Mangalisa, second son of Pulakesi, actually did reign; and, 2dly, Whether Vikramáditya, who began to reign Saka 655, was succeeded by his son Kirtthivarma, or by his nephew of the same name, or by both consecutively. Admitting both these events, and the first seems hardly doubtful, we have seventeen names after Jaya Sinha, and sixteen between the ascertained dates, which, however, only reduces the average of each reign to thirty years. Another supposition is, that the expression "sixteen reigned in the Dekkan" refers only to those who actually enjoyed regal power, and excludes some of the immediate predecessors of Teila; but, on the other hand, the genealogical succession is full and complete, and deduced regularly to Teilapa.

A more authentic æra now commences. Teila having conquered the Rattas, began to reign Saka 895.* He is described as "a new shoot of the royal tree of Chalukya, securing his hereditary dominions from the grasp of the enemy, as Vishnu in the Varaha Avatar saved the earth from Narkasura;"† as "overthrowing the Rattakula, and slaying the brave Munja;"‡ as "destroying Kankara, the moon of the Ratta Kula Sea;"§ and in one instance he has the title of Ahawa Malla.‖ Who these Rattas were does not appear; perhaps they may be identical with the Rahtores. A family of the tribe is mentioned among the feudatory nobles, and will be noticed hereafter.

* Ins. at Tengli, No. 54 of VII., p. 263. "He reigned twenty-four years from Srimukh Samvatsara." See also at Rudwadi, No. 56, p. 268.

† App. No. I.

‡ Ins. at Gadag, No. 40 of VII., p. 235.

§ Ins. at Mangoli, No. 1 of IX., p. 471.

‖ Ins. at Anigiri, No. 7 of IX., p. 561.

The sons of Teila and of his wife Jakabya were Satya Sri and Dasa Varma, of whom the former succeeded him; but dying without issue, was followed successively by his nephews, the sons of Dasa Varma and Bhagavati Devi, named Vikramaditya and Jaya Sinha. The latter assumed the title of Jagadeka Malla, or "sole lord of the world," and is said to have overcome the Chol Raja in battle.*

His son, Someswara Deva I., seems to have had two titles, Trilokya Malla, "lord of the three worlds," and Ahawa Malla, "lord of war." The same authority already quoted, describes him as "defeating Chol, burning Kanchi, besieging Ujjayana,"† and another as "cutting the necks of the lords of Malava, of Chola, and of Kanyakubja, and overcoming his most powerful enemies who had attained superiority over all."‡ A third inscription makes the following vague enumeration of titles: "the elephant in the plantain-garden of his enemies, the Narendra of Chola; the fire drying up the Sea of Malava, the lightning striking the mountain-earth lords of Anga, Wanga, Khasa-Wanga, Pandya, Saurashtra, Kerala, Nepala, Turushka, Bira, Magadha." It then goes on with more precision to announce the following historical fact,—that being on his return from the South, where he had gained a great victory over Chol, whilst halting at the town of Puliyappayana, in the Siddhawadi-Nadu, he bestowed the lands and villages of Sivanur on his chief general and minister, in Saka 981.§

The cause of this expedition is explained in a curious inscription of the time of his son, named also Someswara, or Bhuneka Malla.‖ The Chola Raja, it appears, had invaded Kuntala Desa, and ravaged the southern provinces, taking and burning Pulikara Nagara, now Lakmeswar, famous for its Jain temples, which were all destroyed. After detailing the praises of the local chief who repaired them, and the new grants made to them, it proceeds thus:—"The Dher, or

* Ins. at Nagavi, Nos. 27 and 35 of V., pp. 93 and 107. † Ibid.

‡ Appendix No. I.

§ Ins. at Sudi, No. 24 of V., p. 86. The minister was named Naga Deveiya; his titles are "Mani vegade," or honourable lord, "Danda nayaka," or general of the army, lord of the great Samantas, chief of the Amatya Pada, or great officers like Yama to Chol, the humbler of Bhoj, Bhujanga, Ahe dwipa, Gurjara, &c. Having received the district of Sivanur (now Savanur, or Shaunoor), in which Sudi is situated, by a copper grant, he builds a temple to Nagariswar, and endows it with part of his recently-acquired possessions, recording the grant on a stone, the one now extant. The situation of Puliyappayana has not been ascertained. It is probably south of the Tunga Bhadra.

‖ Ins. at Anigiri, No. 5 of VI., p. 133.

outcast Chola, having forsaken his usual course, and left off practising the virtue of his race, placed his foot in the Belavel Des ;* and having burned many temples, and acquired sin by his own hand, he yielded his head, and left his body to Trilokya Malla, and brought destruction on his race. The excellent temples which Permadi Ganga had constructed, the outcast Pandi Chol destroyed, and descended to Adhogati." Latchma Mandalek repaired them, " at which time the chakra-holder (i. e. Bhunek Malla) stood in the famous place Kakaragonda, on the banks of the South Gunga (or Tunga Bhadra river), in Saka 993."†

Bhunek Malla, or Bhuvanika Malla, seems to have been a weak prince, who did not long retain possession of the crown. In Saka 998, his brother, Kali Vikram, with the title Tribhuvana Malla, expelled him from the throne and usurped the kingdom. " Bhunek Malla, having enjoyed the raj a little while, acted with tyranny, and oppressing the people, lost their affections. His brother was a pattern of every virtue.

" He by his own valour overthrowing his enemies, became lord of all the earth, with the title of Tribhuvana Malla Chalukya Vikramaditya Nripam.

" Having set aside the ancient Saka, he established the Vikram Saka in his own name, &c.

" All the people joining their hands stood by when he mounted the Simhasanam."‡

Another inscription describes him as " attacking the goodly kingdom of Bhunek Deva Malla, and taking it by his own strength of arm in the battle-plain," and afterwards as " rubbing out the Saka," and instituting the Vikram æra in its stead.§

Vikram II. seems to have been one of the most powerful princes of his race. He occupied the throne for fifty-one years, and of the

* The open dry country, in opposition to the hilly rice country bordering on the Ghats. Lakmeswar and Anigiri are situated in a fertile black plain, called Belavel, *par excellence.*

† " The date of this time is obtained by taking the celebrated gunas (or three qualities), the labda (or nine units), the randhra (or nine apertures of the body), Virodhikrutabda chytrmas, &c." The figures above given, written in reversed order according to rule, give Saka 993, exactly corresponding with Virodhikruta. A small village named Kakargudi is still found on the south bank of the Tungbhadra, between Hurryhur and Dawangiri.

‡ Ins. at Gadaga, No. 40 of VII., p. 235.

§ Ins. at Tengli, p. 263. Do. do. Yedravi, p. 223. The Hala-Kanarese word " Manishi" means rubbing out, as figures are swept out of the sand by schoolboys.

whole collection of inscriptions, 151 have reference to his reign alone. In Saka 1003 (the fifth of his reign), we are told that he "overcame Balavaraja, of the Palavanya or Pala race, and sat on his throne,"* and in Saka 1010, that he "crossed the Nermada river and conquered Kanama and others."† But in general his reign seems to have been one of undisturbed peace. He built and beautified a town called, after his own name, Vikrampur,‡ where an enormous tank and other works attest its former splendour. Several inscriptions make mention of his numerous wives, as that recording a grant to the temple of Maleswar by Malabi Devi, daughter of the Shanabhog Ravana, of Yelwatti.§ Another makes mention of Savala Devi, daughter of Jogam Ram, of the Surya Vansa, who received from her lord the rich village of Nerigal for pin-money.‖ The names of Chandal Devi.¶ Bonta Devi, and Letchmi Devi, likewise occur. Towards the end of his reign he was invaded by the Hoisal Bellal prince of Dwara Samudra. But Achyugi Deva, governor of the southern provinces, immediately marched from Yerabaragi against him, "pursued the sun-illuminated Poisala, took Goveya, attacked Letchmaji with great bravery, trod down the Pandyas and the rebellious Konkan, and reduced it to subjection, by order of Vikram Chakravarti."**

In Saka 1049, Vikram was succeeded by his son Someswara III., with the title of Bhuloka Malla, or "lord of the universe," and he successively by his two sons, of whom the elder was surnamed Jagadeka Malla, but his own name does not occur in any of the inscriptions, and has not been ascertained. The younger, Teilapa II., or Nurmadi Teila, bore the title of Trilokya Malla.

The Chalukya dynasty, which had reached its zenith under the second Vikram, began now rapidly to decline. A powerful noble named Vijala, of the Kalachuri or Kalabhurya race, had been

* Ins. at Galganath, No. 10 of VII., p. 185.

† Ins. at Yelwatti, No. 18, p. 202. Who Balavarasa and Kanama were, we have no means of ascertaining.

‡ Now Arasu bidi, in the Hungunda Taluka.

§ No. 92, p. 338.

‖ No. 7, p. 179. Angabhogam, her private allowance, or pin-money. Nerigal, in the Hangal Parganah, is styled an ancient Agraharam. It is one of the richest villages in the country.

¶ P. 263.

** Ins. at Nerigal, in the Dambal Parg., No. 135, p. 395. Yerabaragi is now Yelburga, in the Nizam's territory. Goveya is the old name of Goa. The invader was probably the fourth Bellala, Vishnu-Verddhana, and grandfather of Vir Bellal, who afterwards subjugated the southern provinces of the Chalukya kingdom.

appointed general of the Chalukya armies ;* and the influence which he thereby obtained he turned against his sovereign, and expelled him from his throne. Inscriptions in his name occur from Saka 1079, which is styled the second of his reign ; but for several years he was contented with the subordinate style and titles of a great noble, " Maha Mandaleswar," &c. In Saka 1084, the seventh of his reign, he marched into the southern part of the kingdom, whither the Chalukya prince had fled, and where he maintained himself amid the forests and mountains bordering on the Ghats. Here, at Anigiri, Vijala, for the first time proclaimed himself eka chhatra, or supreme, and assumed all the royal titles.†

We continue however to find grants by Trilokya Malla Teilapa from Saka 1072, the year of his accession, to Saka 1085, and these are not confined to the S. W. portion of his kingdom only, but occur in the Nizam's country, and even towards the Krishna. In Saka 1079, he is mentioned as reigning at his hereditary capital of Kalyan‡ but in the last inscription that was procured of his reign, in Saka 1085, he is said to reign at Jyntapur, or Banawasi.§

His son, the last of the race, was Someswar IV., or Vira Soma, who assumed the title of Tribhuvana Malla, which had previously been borne by Vijala. He succeeded to the fallen fortunes of his house in Saka 1104, and for a while upheld them. The religious feuds that raged at Kalyan, consequent on the establishment of the Lingayat creed, occupied Vijala and his sons too fully to admit of their effectually crushing the last feeble attempts of the Chaluk princes to maintain themselves. Accordingly we find Vira Soma recovering a temporary degree of importance. In an inscription at Anigiri, dated Saka 1106, the third of his reign, Anigiri being in the open country, where Vijala first assumed the regal titles, we find the following abstract: " In the Kuntal des, by their wisdom and strength of arm, reigned the Chalukya Rayas ; afterwards, by conquest, the Rattas became supreme ; the Chalukyas were then restored ; subsequently the Kala Churyas became masters of the land ; after whom, by the appointment of Brahma, Vira Chalukya Soma ascended the throne. His servant, living by his lotos feet, Vira Bomana, the son of Ravana

* Ins. at Harsur, No. 10 of II., Kalabhurya, vol. ii. p. 46. Kalgi, No. 15, do. do. p. 52.

† Ins. No. 6. The royal style and titles invariably ran thus: " Sri-prithwi-wallabha, Maharaj-adiraja, Raja-parameswara, Param-bhataraka," &c. In the Ins. of Saka 1083, he is only styled Maha Mandaleswar.

‡ Ins. at Kembhavi, No. 3 of X. p, 535.

§ Ins. at Pattadkal, No. 9, p. 544.

Danda Nayak, like as Parasuram, son of Jamadagni, destroyed the thousand-armed, so he, having vowed that he would uproot the destroyers of his master, and make the Chálukyas again lords of the earth, became the destroying fire of the Kalabhurya Kula." Then, extolling his bravery, he is described as "driving aside Kerala and Gurjara, and making Ballam bow before him, as a wife bows before her husband."*

The limited range, however, within which the inscriptions of this prince occur, none of them being far north of the Tungabhadra, mark the partial nature of his success. One of them is remarkable as having been made on the same stone, and under a grant of Vijala's. In a contest between the Lingayats and Jains, at Ablur, about the year 1089, in which the former had obtained a decided advantage, Vijala (himself a Jain) bestowed certain rewards on the successful Lingayat devotee, named Ekanta Ramiah. The second inscription then proceeds to relate, that at the time when "the excess of the brilliant light of Tribhuvana Malla Vir Soméswar Chálukya had put to flight the darkness of Tribhuvana Malla Vijala of the Kalabhurya race, Bomana Danda Nayak having re-established the whole Chálukya-raj, and being at Selihali Kop with the king, they heard that Vijala had sent for Ekanta Ramiah, and given certain grants to Soméswar Deva, of Ablur, wherefore they also sent for him and conferred other gifts upon him," &c. It is without date.†

Such are the last records of this powerful family. What ultimately became of Vir Soma does not appear. He seems to have maintained himself for a longer period than his opponent, the last of whose grants is dated Saka 1104, while Vir Soma's extend to Saka 1111.

About this time, taking advantage of the distracted state of the country, the Bellalas of Dwara Samudra, or Halabidu, advanced from the south, while the Yadavas of Devagiri extended their encroachments in the north, till meeting near the Krishna, a struggle ensued between them, in which the minor actors entirely disappear from the scene; and which, after various success, terminated in the Yadavas obtaining undisputed possession of the ancient limits of the Chalukya kingdom.

Vir Someswar IV. was the eleventh prince from Teilapa I.; their reigns extend over a period of 216 years, affording an average of somewhat more than nineteen years for each reign,—a duration equally consonant with analogy and probability.

* Ins. No. 4 of XI., p. 559. Ballam was founder of the Yádava dynasty of Dévagiri.

† Ins. at Ablur, No. 17 of Vijala, vol. ii. p. 33.

Most of the princes seem to have been votaries of Siva.* Their titles are mostly derived from Mahadeva. All their grants bear the figure of the Lingam, and commence with an invocatory stanza to the Varaha avatar. In several of the beautiful ruins of magnificent temples erected during their time, with which the Southern Mahratta country abounds, the figure of Mahadeva occupies a central position in the sculpture over the entrance, with Brahma on the one side, and Vishnu on the other. But at the same time the most perfect toleration seems to have been extended to all other creeds. Both the Jain and the Buddha faith were openly professed, the former to a great extent, —a considerable proportion of the inscriptions recording grants to temples of that persuation. The occurrence of Buddha titles in the copper grant of Vikramaditya has already been noticed ; a more distinct evidence of the existence of this creed occurs in some inscriptions in a deserted temple within the Fort at Dambal, commemorating grants made by the Shetty (Sreshti, or mayor), and the corporations of trading communities during the reign of Vikram II., Saka 1017, for the endowment of Bhuddhist Vihars.

Traces of the Ophitic worship are also observable. Frequent mention occurs of individuals of the Snake race. Such appears to have been the general of Someswar I., mentioned in note (4) at p. 205. At Bheiranmati, near Bagulkotah, is an inscription made by a Mandaleswar, named Sindhu, of Nagavansa, who was born at Ahechhatra, on the Sindhu river, where his parents had gone on a pilgrimage, and who, in consequence of a vow to the Snake king (panagi adipati), was dedicated by them to Aheswara.† Other nobles were of the Ahehya race.‡ Many of the old temples are filled with sculptured representations of snakes, on separate slabs of stone, as if they had been set up for purposes of adoration, and collections of them may be seen at the entrance of almost every village throughout the country, ranged along some crumbling wall or ruined edifice in the precincts of the town.

* Rana Ragaha has the title, "Hara Cherana raja," fixing his desire on the feet of Hara ; Someswar III. is said to rejoice in the worship of the feet of Hari Hara, and of the lotos-born Brahma ; Someswar Bhatta, the chaplain of Vikram II., bears the title Araddhya, which is peculiar to Seivak priests, and he makes a grant to a temple of Siva, p. 235. But on the other hand, the grant of Vikramaditya, p. 7, records that the raja having taken counsel from his own spiritual guide (Swaguru), Neravidya Pandit Yatipati, bestowed a gift on the Jinendra of Pulikara Nagara ; from which it appears the guru was a Jain, Yati being the distinctive title of that priesthood.

† Ins. No. 1. of I., p. 10. He is called "Visha Kula tilaka phanna mani kirana vibhasura Nagavansa udbhava," the pride of the poisonous tribe, born of the jewel-adorned, hood-ornamented Snake race.

‡ Ins. at Yedravi, No. 31 of VII., p. 223. Nagavi, No. 27 of V., p. 92.

These varieties of faith, and this general toleration, are the more remarkable from the spirit of religious hatred and persecution which was soon after aroused, and which remains in full force to this day among Brahmans, Lingayats, and Jains.

OF THE KALABHURI, OR KALACHURI RACE.

THE representatives of this race were for several ages great nobles at the court of Kalyan.* The first mention of the tribe is made in the great inscription at Ye-ur, where they are said to have been overcome by the early Chalukyas, together with the Rattas. The present family, however, do not go back very far. They claim to be of the Soma Vansa, in which was formerly born Sankarasu, after whom, born of a Brahmani mother, was Krishna, who reigned over Kalanjarapura; several generations after whom was Santarasu, who appears to be mula-purush, or founder of the family. The genealogy then continues as follows:

Santarasu
|
Sagarasu
|
Kanama, or Kanwa
|
1. Vijala — o
2. Rajala
|
Karna
|
Jogama Deva
|
Permadi Deva
|
Vijala, Tribhuvana Malla.
|
1. Someswar Deva, or Raya Morari Sovi Deva
2. Sankam Deva,† Ahawa Malla.

Nothing important is known of the names in the above list antecedent to Vijala.‡

* According to the Jain Guru of Malkheir, they were hereditary nobles, or Mandaleswars, of the province of Kalyan.

† Ins. No. 4 of II., vol. ii., p. 41.

‡ The titles of Vijala before he effected his usurpation were, "Maha Mandaleswara, the great lord of Kalanjra pura, with the ensign (dhwaja) of the golden bull, damaruga turiya nirghoshanam, (?) the sun of the lotos tribe of Kalachuris," &c. Maha Mandaleswar is the title of all the great nobles. Kalanjrapur is Kallinger in Hindostan, from which the family seem originally to have emigrated to the South. Abal Fazl has the following notice regarding Kallinger: "Kallinger is a stone fort situated on a lofty mountain. Here is an idol named '*Kalbhiroop*,' eighteen cubits in height." &c.—*Ham. Gaz.*

The circumstances of his usurping the throne of the Chalukyas, and driving them from Kalyan, have already been stated, together with the little that has been gathered of his son's contests with them. He would probably have transmitted his throne to his posterity, had not the growing sect of the Lingayats at this time arrived at such a pitch of power and enthusiasm, under their celebrated founder Basava, as to cost Vijala his kingdom and his life.

The history of this revolution is contained in two works, called the Basava Purana,* and the Vijala Cheritra, or Bijalenkin Kavya, the one the text-book of the Lingayats, the other of the Jains. But in both there is such a preponderance of supernatural agency, and so much legendary lore intermixed with historical facts, that it is difficult to separate the truth from the fable.

The Bijalenkin Kavya opens with a description of Bijala reigning at Kalyan, over the Karnatakdes, in which were numerous Jain, Vishnu, and Siva temples. His ensigns were the Lion, *the Bull*, and the Goose; his troops consisted of 196,000 horse, 10,000 elephants, and more than a lakh of foot soldiers. He had 1000 hill-forts, 1000 in the plain, and 1000 along the shore, and he was of the Somvansa of the race of Pandu.†

Basava was born at Bagavadi,‡ in the Mudibahal Parganah, a few miles N. of the Krishna, according to local tradition, though the Puran ascribes that honour to the neighbouring village of Ingleswar. His father's name was Madhu Bhatta, or Madiga raya, an Araddhya, or Saivak Brahman; his mother was named Madalambiki,§ and he had a sister named Padmavati, who is described as having been very beautiful. The family seem to have left Bagavadi and gone to Kalyan, where Basava formed an alliance with the chief minister by marrying his daughter, named Gangamba,‖ soon after which, Vijala having seen the beautiful Padmavati, became enamoured of, and married her; and in consequence of these connexions her brother was appointed minister and general (Danda Nayak adipati), in succession, to his

* There are at least five different versions of this work, two of which are Kanarese, two Sanscrit, and one Telugu. The two Kanarese versions are by Bhima Kavi and Yellendra Sadaksharapa, of which the former is most frequently met with, and has been here followed. The Telugu version is by Som Araddhya, and the two Sanscrit ones are by Shenkar Araddhya and Buslingapa.

† Vijala Cheritra, Book I.

‡ Local tradition.

§ Local tradition and Vijala Kavya.

‖ Basava Purana.

brother-in-law. The Raja gave himself up to the charms of his beautiful bride, and left all power in the hands of Basava, who employed the opportunity thus afforded him to strengthen his own influence, displacing all the old officers of state and putting in adherents of his own, whilst at the same time he sedulously cultivated the favour of the prince.* He likewise began to promulgate a new rule of faith,† differing both from that of the Jains and Brahmans, hitherto the most popular sects. He abolished the distinction of castes, all his followers being enrolled by a particular ceremony into a new and equal order: he himself, and the priests under him, named Jangamas, were regarded as incarnations of the deity. They observed the same strict abstinence from animal food, as the rival sects, and were equally strict and minute in the circumstances to be observed in cooking and eating, but they rejected many of the previously entertained opinions regarding purity and impurity. The great object of adoration was the Lingam, and Nandi, the sacred bull that carries Siva, of which Basava proclaimed himself an incarnation. The effigy of their creed, a small stone Lingam in a silver box or shrine, was suspended to the neck, instead of being bound round the arm, according to the practice of the Araddhyas. It is evident that their is much of the Saivak doctrines professed by the Araddhya Brahmans to which Basava belonged, incorporated in the new creed.

Basava increased rapidly in power, and at length roused the fears of Vijala, who endeavoured to seize his person. He made his escape, however, and fled. Pursuit was ordered, but Basava collecting some of his followers, attacked and dispersed the party. His adherents flocked to him, and Vijala advancing in person to quell the insurrection, suffered a complete defeat‡. He was compelled to submit to his victorious minister, who returned with him to Kalyan, reinstated in all his dignities. Basava, on his return, not only resumed all his former power and authority, but even attempted the life of Vijala, probably with the intention of governing unmolested, during the minority of his nephew, the son of the Raja and Padmavati, who is named Alya Bijal, Imadi Bijal, and Vir Vijala. In this he eventually succeeded, but authorities differ as to the manner. The Jain Chronicle relates, that the Raja having marched against the Silahara, a rebellious feudatory, the Maha Mandaleswara of Kolapur, was returning successfully from the expedition, when Basava found means to poison him on the banks of the Bhima.§ The Puran relates that he was assassinated in the

* Vijala Kavya, Book I.
† Ibid. Book II.
‡ Ibid. Book III.
§ Books XI. and XII.

midst of his court by three of Basava's followers, named Jagadeva, Bomeiya, and Maleiya, while a third legend asserts, that Madawal Macheiya and Bomeiya, the Masalchis, or torch bearers of Basava, having concealed their weapons in the roll of cloth serving for a flambeau, stabbed the Raja whilst preceding their master into his presence.* This event is said in the Vijala Kavya to have occurred in the year 4255 of the Kali Yuga, which corresponds with Saka 1077. Vijala's death, however, according to the Inscriptions, did not occur till eleven years later, in Saka 1087, or 1088. It is probable therefore that there may be a clerical error in the MS.

The murder, however perpetrated, did not go unpunished.—Basava, dreading the vengeance of the young Raja, here named Yuva Raja†, probably the Morari Sovi Deva of the inscriptions, fled to Vrishabapura, on the Malabar coast. Thither the Raja pursuing him, laid siege to the city. It was reduced to extremity, and Basava, in despair, threw himself into a well and was drowned. His body was taken out, and ignominiously thrown without the city walls, and thenceforward the name of the city was called Ulavi, because Basava thought he would there save himself, a name which it still retains.‡

The sect, however, found a more able, or, at least, a more successful leader, in Chen Basava, the son of another sister of Basava, named Aka Nagama,§ or according to others, Nagalambika,|| by whom the Lingayat belief was completely established. It is now the prevailing form of worship throughout the whole of the country where the Kanarese language is spoken, comprising the greatest portion of the Nizam's territories, the Southern Mahratta country, Sunda, Mysore Bellary, &c.

What was the ultimate fate of the Kalabhuryas is not known; no further mention of them occurring either in books or inscriptions. The Karnataka desa now became the prey of the Yadavas.

* The last is the local tradition. Sangam Busapa, Desayi of the Nalatwad Parganah in the Mudibihal Talooka, claims to be descended from one of these murderous torch-bearers.

† See Journal Royal Asiatic Society III. p, 102. note.

‡ "Illi hodre Ulivine yenta avurille hokadavinde Ulavi hesaru bantu." "Because he entered into that town, saying, 'If I go there, I shall be saved,' the name Ulavi was applied to it." This account of Basava's death is entirely taken from the Jain history. His own sect declare that he was absorbed by the Lingam, or the Sungameswar temple, at the junction of the Malapahari and Krishna rivers; and a depression in the surface of the Lingam is still shown as the spot at which he entered. Ulavi is a celebrated place of Lingayat pilgrimage, about twelve or fourteen miles west of Yellapur, in Sunda, at the foot of the Ghat leading down to the coast.

|| Basava Purana.

§ Chenbasava Purana.

OF THE YADAVAS.

Two dynasties of this race successively obtained supremacy in the Karnataka empire, as stated in the table at p. 5; or, rather, this supremacy was contested between them from the fall of the Kalabhuryas, and ended in the establishment of that of the Devagiri branch. At first, however, the southern princes had rather the advantage. These were the Bellalas, or Hoisala Bellalas, of Dwara Samudra or Dwaravati pattana, now Halabidu, in Mysore, who have been made known by Colonel Wilks and the Mackenzie collection. The only individuals of this dynasty whose inscriptions occur in the present collection are Vira Bellala and his son Vira Narasimha Deva, but the genealogy of the family is given in detail in several of these.* Deriving it generally from Brahma through Atri, Som, Buddha, Nahush, Yayati, to Yadu, they continue, that in the race of Yadu was born Sala, lord of Sasakapura, who having delivered a holy man from the attack of a tiger, received the appellation of Poisala or Hoisala, and adopted the tiger, or shardula, as the ensign of his family.

Sala
|
Vinayaditya
|
Yeriyanga Deva
|
- 1. Bellala — o
- 2. Vishnuverddhana, Visht, or Bitti Deva — o
- 3. Udayaditya, married Lakama Devi
  - Narasimha, married Achil Devi
    - Vir Bellala, married Padmala Devi
      - Narasimha.

In the sloka, or verse, recording Vishnuverddhana, he is described as ruling from his own limits to Uchchangi Durga, and it is added, that

* No. 2, at Gadaga, vol. ii., p. 115; No. 11, at Anigiri, vol. ii., p. 130; No. 23, at Harihara, vol. ii., p. 141. The legend, more in detail, is as follows :—" In the glorious Yadu Kula, as the sun rises from Udayachal, so arose the famed Sala, residing in Sasakapura. In the gardens of that town, a Bratipati, or Yati, sitting at tapassya, was attacked by a tiger (Puli), a beast (Shardula) with dreadful eyes, fearful teeth, and lashing his sides with his tail. The Muni gave the heroic Sala a weapon, blessed it, and said, 'Saladu Poi,' ('draw and kill'); on which, unsheathing the sword, he killed the shardula. Hence the name Poisala, or Hoisala, &c." Ins. p. 115.

The effigy of a man killing a tiger, is carved and placed over many of the temples built by, or in the time of, Bellala. The group is generally placed on the roof, in front of the goparam, or pyramidal tower of the temple, over the entrance, or principal doorway. Sometimes the figures are repeated over the side doors.

his horses laved their sides in the Krishna.* Uchchangi Durga is near Harponhully, to the Zemindar of which it latterly belonged, having come to him by an intermarriage with the Chittrakal or Chiteldurg chief. This then, being the northern boundary, it is evident that he never established himself in the Southern Mahratta country, or Kuntaladesa.† But we have seen that an invasion of the country, by a Hoisala king, took place in the last years of Vikram Chalukya II., which was repelled by his general, Achyagi Deva. As Vishnuverddhana must have been a cotemporary of Vikram, it is probable that these expressions were occasioned by the expedition alluded to, and it is not improbable that he may have penetrated to the Krishna, before his progress was checked. But it was his grandson, Vira Bellala, who obtained a permanent footing north of the Tungabhadra. After the usual grandiloquent boasts of "issuing his commands to Anga, Kalinga, Vanga, Magadha, Chola, Malava, Pandya, Kerala, Gurjara," it is added, that his general, or Chamupati, named Bomma, defeated the army of the Kalabhurya Kshetri, commanded by Brahma Chamupati, capturing sixty elephants. It is added, that "he destroyed the ship of the southern country," and overcame "Ballam Deva, and acquired supreme power over the whole of Kuntala Desa."‡

He seems for some time to have fixed his residence at Lokigonda, now Lakundi,§ near Dambal, where are some fine architectural remains, and where the tradition of a battle having taken place between two great kings still exists. This refers to one of the engagements between Bellala and Ballam Deva, of Devagiri, in which the latter was defeated and driven back‖ from Surtur to Lokigonda; immediately

* Ins. at Gadaga, No. 2, vol. ii., p. 115.

† In another place he is said to have "conquered Kanchi and the Kangya des; that through fear of him the seven konkanas fled into the sea, and Virata nagara came out at the sight of his army." According to local tradition, Hangal, on the Dherma river, is called Virat nagara; but in the inscriptions it is always denominated Panungal, P and H being interchangeable in Kanarese. The remains of enormous fortifications, enclosing a great extent, are still visible. I have got a plan, distinctly showing the circuit of seven walls and ditches on the side not covered by the river. I made an excavation in a remarkable tumulus, called Kuntawas, within the walls, but obtained nothing of interest. Ins. at Harihara, No. 23, vol. ii., p. 147.

‡ Ins. at Gadaga, No. 2, vol. ii., p. 115.

§ Ins. No. 2, ibid, and No. 3, at Belgami, p. 118.

‖ Ins. at Anigiri, No. 11, p. 130. The description of this battle is very lively and spirited: "Boasting of his elephants, his horses, his men, Ballam Nrapa exclaimed, 'Who dares oppose me?' Belal, mounting his single elephant, urged it onwards; and trampling down his army, pursued him, and slew him, chasing him from Surtur to Lokigonda, and exclaiming, 'Yelle,' (a contemptuous exclamation), 'I, who like Chaladanka (the persevering or fierce) Rama, cutting off the Dasasur (Ravana), have used the Varala, Lala, Kerala, Magadha, Andhra, Goula, Khasa, Gurjara, Anga, Kalinga Bhupatis, like targets for my bow,—what difficulty have I in destroying you?'"

after which, in reciting his titles, Bellala assumes that of "winnowing like chaff the state of the worshipper of Narayana Chalukya," and proclaims himself the lord of Uchchangi, Banavasi, Panungal, &c. In another place, he is styled lord of the following six provinces:—Talakal, Gangawadi, Nonambawadi, Banavasi, Panungal, and Uchchangi.*

Halur, or Hullur, on the Tungabhadra, was likewise his residence for some time, and the plain around bears traces of an immense encampment, with erect stones to fasten the elephants, horses, &c.†

He again defeated an army of 12,000 cavalry, and many foot, sent against him by the Devagiri prince (probably Jayatuk Deva), under the command of his general, Soma Nrapa, pursuing him from Surtur to the Krishna, and making himself master of the following fortified places,‡ Yerambadagi,§ Manavi,|| Viratankoti,¶ Gunati, Belatagi,** Surtur,†† Kurgoda,‡‡ and laid siege to Durga. §§

The influence of the Bellalas, north of the Tungabhadra, seems to have ceased with Vir Bellala. The only inscription of his son, that I have got, is from Harihara, or Hurryhur, on the south bank of that river; and in that, the acts attributed to him are entirely confined to the country still farther south. He is described as "slaying the son of Kandava Raya, conquering Pandesa, and replacing Chol upon his throne." Farther on he has the titles of a "thunderbolt to the mountain of Pandya, a Kanthirava, or lion, to Kandava Raya, like Jinardhan to Keitaba Raya, overthrowing the kingdom of Makara Raya, the confirmer of the Chola Raja's power," and he is said to be reigning at Deva Samudra.|| ||

It seems evident, then, that the influence of the Bellalas over the districts north of the Tungabhadra, was confined to the reign of Bellala; but even that did not extend far. All Bellala's grants occur in the

* Ins. at Herur, No. 16, vol. ii., p. 141. There is a place named Talakal, near Surapur, but this seems too far north for Bellala's limits, all the country north of the Krishna being, at this time, in undisturbed possession of the Devagiri prince. The other places are all to the south.

† Ins. at Satayanhali, No. 13, vol. ii., p. 136.

‡ Ins. at Harihara, No. 23, vol. ii., p. 147.

§ Yelburga, Nizam's territory.

|| Near Raichur.

¶ Panangal, or Hangal?

** Now Rettihali, in the Rana Bidnur Taluk.

†† Near Dambal, the Jaghir of the Dambal Desayi.

‡‡ Near Harihara.

§§ Durga is now applied, *par excellence*, to Chittledrug.

|| || Ins. No. 23, p. 147.

space contained between the Malapahara and the Tunga; bearing dates from 1114 (the third of his reign), to 1133; and the country north, to the Krishna, seems to have been frequently contested, and to have belonged, undisputedly, to neither party, though the advantage seems generally to have been on the side of Bellala.

OF THE DEVAGIRI YADAVAS.

No information is given in any of the inscriptions of the origin of this branch of the Yadavas, but it is not improbable they sprang from the Bellalas. The enmity that subsisted between the two races would induce the former to withhold all mention of their descent from their rivals, in their enumeration of titles, and may account for Ballam being always referred to as the founder of the family; or, he may have been some petty local chief, who had risen into power, and assumed the Yadu titles. The genealogy stands thus, in an inscription at Harihara: "Sri Lakshmi, and Taradi Natha (the moon), were born from the Kshira Samudra. Soma became the first Raja in the three worlds, and in this distinguished race was born Yadu Raya, from whom descended other Yadava earth-rulers. Afterwards, as Ram Krishna became sole lord of the earth by the destruction of the Asuras, so Balam Nrapa destroyed the Kshettris."

Ballam
|
Jayatuk Deva
|
Simha Deva
|
* * * * * *
|
Kandaraya Deva, or Kanner Dev — Mahadeva
- Kandaraya Deva, or Kanner Dev: o
- Mahadeva
  - Ramchandar
    - 1. Shenkar Deva
    - 2. Bhima Deva.
    - 3. A daughter, married Hari Pal Deva.

In another inscription, Kandaraya, or Kanner Deva, is addressed as "endowed with all power, the great lord of Dwarawati pura, sprung from the Vishnu Vansa, with the standard (dhwaja) of the golden Garuda; the sun expanding the closed petals of the lotos-like Yadu Kula, a Trinetra (Siva) to the Madana-like (Kama) Malava, the terrifier of the Gurjara raya, causing the Konkana raja to tremble, the thruster-out of the Hoisala rayas, the restorer of the Telunga raya,

&c."* The assumption of the title, Dwarawati pura varadiswar,† seems in favour of their common origin with the Bellalas.

In a grant of Ballam Deva at Hippargi, there is a historical summary of the Kuntal des. After describing it, the statement continues, "in which first reigned the mighty race of Pandu, and after them many others * * * * of the Surya vansa became illustrious * * * * * the Chalukyas,‡ many of whom having reigned with power, they were overthrown, and the race of Kalabhurya Bijala obtained celebrity by the strength of their arms, and reigned for a time; after which, the splendour of the Yadu Kula became conspicuous like that of Bhima."§

Ballam is elsewhere characterised as "acquiring the whole Karnatak des,"‖ and as making a grant whilst the royal residence was at Tinavaligi, in Saka 1112. This must have been during his contests with Bellala, at which time only he is found so far to the south.¶

The grants of his son, Jayatuk Deva, are confined entirely to the north of the Krishna. One of them is built into the ark, or citadel, of Bijapur.

His son, Sima Deva, succeeded in 1132, and took advantage of the death of Bellala, which must have occurred not long afterwards, to extend his power to the south. In various inscriptions, he is described as "the sun, dispelling the mist-like army of the Karnatak sovereign," referring to Bellala, and "the terrifier of the Kalachuri Raja,** as having conquered all hostile kings, and elevating his chatra or canopy sole upon the earth,†† as the lordly elephant (Gujendra), rooting up the garden of the power of Hoisala, Bellala, and the Veinateiya (or Garuda) of the serpent Bhoja, lord of Pannala."‡‡ In another place,

* Ins. at Manoli, No. 2 of IV., vol. 2, p. 225. I think, too, that they adopted the lanshana, or symbol of the tiger, or shardula. The ruins of a magnificent temple, much mutilated, in the fort of Bankapoor, and which was, I believe, of the time of Simha, (but I have mislaid a long inscription obtained there), is covered with the head of the fabulous animal called shardula, or simha, employed as an ornament in every part.

† See two Ins. at Mulgi, No. 1 of I., Vol. 2, 154.

‡ The inscription is here rather defaced; the omissions should probably be filled up with, "the Ratta Kula became illustrious, and to them succeeded the," &c.

§ No. 4 of I., vol. ii., p. 159. ‖ Ins. at Anigiri, No. 2 of I., p. 156.

¶ Ins. at Multgi, No. 1 of I., vol. ii, p. 154. Tenavaligi is the modern Tillawali, a small Parganah and Kusbah, between Hangal and Kode.

** Ins. at Belgami, in Mysore, No. 3 of III., vol. ii., p. 174. His other titles in this are, "the ankoas of the elephant-like Rajas of Gurjara and Malava, and the confirmer or ally (sthapanacharya), of the Telunga raja," referring, perhaps, to the Andhra soveriegn.

†† Ins. at Manoli, No. 7 of III., vol. ii., p. 177. In this is found, among his titles, "the sun expanding the lotus-like Jayatuga kula," in allusion to his father's name.

‡‡ Ins. at Telwalli, No. 199, of III., vol. ii., p. 191. For an account of Bhoja, see genealogy of Kolapur Chiefs and Bombay Transactions, viii., 396.

his general, Hon Bomma Deva Sein Adipati, governor of Mulgund, presents him with "fourteen elephants, the best of the spoil which he had taken from Narasimha Nrapa, with great bravery, in the Konkana, which he conquered by order of his master, Simha Deva, the subduer of the South."* This Nara Simha is most likely the son of Vira Bellala.

Most of Simha's later grants describe him as reigning permanently at Devagiri, "conspicuous among the eighty-four Durgas."†

The name of his son is not recorded, but he appears to have died before his father, the latter being succeeded by his grandson, Kannar Deva, probably about Saka 1170, and he by his brother, Mahadeva, in 1182.‡ The latter frequently assumed the title of Lord of the South Country, reigning at Devagiri.

His son Ramchunder, who succeeded in 1193, closes the series of the independent Hindu princes of the Dekkan. In Saka 1216, the Muhammedans first turned their arms against the south, and the events that occurred subsequently, are thus related by Ferishta.

"In the year 693 A. H. (1294, A. D.) Saka 1216, Allaood Deen, after taking leave of the king (Julalood Deen Feroze Ghiljee), at Dehly, proceeded towards Kurra, where he enlisted many chiefs of distinction, who had formerly been dependants of the Bulbun family. He then marched with 8000 chosen horse, by the nearest road, against Ram Dew, Raja of the Deccan, who possessed the wealth of a long line of kings.§

"Allaood Deen, arriving on the Deccan frontier, pressed forwards towards the capital. The first place of any consequence which he reached, was Elichpoor, where, having made a short halt, to refresh his army, he moved by forced marches to Dewgur, the lower town of which was not entirely fortified, the outer wall being incomplete. When the news of Allaood Deen's progress reached the Raja, he together with his son, Shunkul Dew, was absent in a distant part of his dominions; the Raja hastened his return, and endeavoured to intercept the enemy with a numerous army. For this purpose, he threw himself between Allaood Deen and the city, and opposed him with great gallantry, but was eventually defeated, with severe loss."

* Ins. at Rettihala, No. 20 of III., vol. ii., p. 197.

† Ins. at Yelawal, No. 34 of III., vol. ii., p. 213.]

‡ The last inscription of Simha that has been obtained, is dated Saka 1169; he had then reigned thirty-eight years. There are only four relative to Kanner, none of which mention the year of his reign.

§ Colonel Briggs supposes Ram Raja to have been king of only a part of the Dekkan, but we have seen from the inscriptions that his power extended from the Nermada to the country south of the Tungabhadra. Briggs, Ferishta, i., 304, note.

Other authorities quoted by Ferishta offer a somewhat different account, stating that when the Muhammedans arrived at Devagiri, the Raja himself was there, but his wife and son were absent on a pilgrimage. The Raja hastily collected a few followers, and, after vainly trying to oppose the enemy near the city, retired into the fort, carrying in a great quantity of sacks belonging to passing traders, believed to contain grain, but in reality filled with salt. Allaood Deen took the town and levied heavy contributions on the merchants, while he vigorously pressed the siege of the fort. Rama Deva at last offered to buy off the enemy, and agreed to pay him fifty maunds of gold on condition of his raising the siege. But in the meantime Shenkul Dev (Shenkar Deva ?) who had been collecting troops in the provinces, approached to attack the Muhammedans; and, in spite of his father's orders to the contrary, who wished to maintain faith, he attacked Allaood Deen, and, though successful at the commencement of the action, suffered a complete defeat.

Rama Deva then again offered terms, and was the more urgent that he only now found his provision was salt instead of grain, and it was finally agreed that the enemy should retire on receipt of 600 maunds of pearls, two of jewels, 1000 of silver, 4000 pieces of silk, and " a long list of other precious commodities to which reason forbids us to give credit,"* and that an annual tribute should be sent to Dehli.

The last condition, however, seems to have been irregularly performed, for in A. H. 706, Saka 1228 (A. D. 1306), an army of 100,000 horse, under Mullik Kafoor, surnamed Hazar Dinari, was dispatched to collect the arrears then due for three years. He was likewise ordered, at the instance of Kowla Devi, one of Allaood Deen's (now king) wives, to secure and bring to Dehli a daughter named Dewal Devi, by her former husband, Kurrun Raj, Raja of Kandeish, or some neighbouring country. This princess had been long sought in marriage by Shenkul Dev, of Devgur, but he being a Mahratta and she a Rajput, her father refused his consent. In his present extremity, however, after bravely defending his country, he agreed to the alliance, and Dewal Devi, then thirteen years of age, was dispatched to Devagiri, under the escort of Bherm Dev, Shenkul Dev's brother.

Kurrun Raj soon after was totally defeated, and fled to Devagiri, pursued by the enemy. When close to that city Dewal Devi accidentally fell into the hands of a Muhammedan detachment. She

* Briggs, Ferishta, vol. i., p., 304-8.

was immediately sent to Dehli, and subsequently married to Khizr Khan, the king's son.*

Meantime Mulik Kafur pressed the siege of Devagiri, having previously subdued a great part of the country, which he bestowed upon his chief officers. Rama Deva soon after submitted. He accompanied Mullik Kafur to Dehli, where he was received with distinction, and reinstated in his government, with the title of Raj Rayan. Other districts were added to his dominions, among which was Nousari, in Guzrat, &c.; he received a lakh of tunkas for his expenses in returning home. Rama Deva did not again fail to send the annual tribute to Dehli during his lifetime.†

In the year A. H. 709, Saka 1231 (A. D. 1309), he hospitably entertained Mullik Kafur and Khawaja Haji at Devagiri on their march to subdue Warangole. On leaving them the Muhammedans are mentioned as entering the Telingana frontier at Indoor. This is the last mention that occurs of Rama Deva,‡ who died the same year.

The following year the same generals again came to Devagiri, on their march to the conquest of Dwara Samudra, but finding Shenkal Dev less friendly than his father had been, they left a detachment at Pytun to keep open their communications whilst occupied in the total destruction of the Bellal Yadavas, who are styled by Ferishta Rajas of *Karnatak.*§

Shenkul Dev showed his aversion to his conquerors more openly by withholding his annual tribute, which provoked another expedition against him, and Mullik Kafur a fourth time marched into the Dekkan in the year A. H. 712, Saka 1234 (A. D. 1312). He seized Shenkul Dev and put him to death, and laid waste his kingdom from Dabal and Choul, to Raichoor and Mudkal, and fixed his own residence at Devagiri.‖

The latter years of Allaood Deen's reign were embittered by domestic dissentions, which encouraged the numerous conquered provinces to raise the standard of revolt. Among those who asserted their independence was Hurpal Dev (Hari Pal Deva), son-in-law of Rama Deva of Devagiri, who stirred up the Dekkan to arms,¶ and expelled a number of Muhammedan governors, and during the troubles that followed the death of Allaood Deen in A. H. 716, Saka 1238 (A. D. 1316), recovered most of the ancient possessions of his house.

* The loves of the prince and princess are stated by Ferishta to form the subject of a celebrated Persian poem, by Amir Khusro Dehlivi.

† Briggs, Ferishta, vol. i., p. 365-9. ‡ Ibid. p. 371. § Ibid. p, 373.

‖ Briggs, Ferishta, vol. i., p. 378. ¶ Ibid. p. 381.

But this success was of short duration. Soon after the succession of Mubarik Ghilji, he marched in person to the Dekkan, and on his arrival at Devagiri, Hurpal Dev with his confederates, not even waiting for attack, fled in dismay. He was pursued, taken, flayed alive, and his head placed above the gate of his own capital.*

This seems to be the last notice that occurs of the Yadava dynasty of Devagiri. Their capital was occasionally the scene of the contests that ensued during the final subjugation of the Dekkan, but it is only mentioned in the light of a subjugated province† until, in A. H. 739 (A. D. 1338), Muhammed Toghluk made it the metropolis, of the empire, and removed thither the population of Dehli, giving it the name of Dowlatabad, which it still retains.‡

OF THE NOBLES AND GREAT FAMILIES OF KUNTALA DESA.

The remaining inscriptions in the volume relate, some to the last great dynasty that existed in Southern India, that of Anagundi or Vijayanagar, some to the grants made by different local chiefs, and the remainder to those by village officers or obscure individuals not deserving of notice, either because the name of the sovereign under whom they were made is not mentioned, the date not given, &c.

Of the first class (that of the Vijayanagar dynasty), the number procured is not sufficient to make up a complete series, and more has already been made known concerning them than can be offered here. The list in the catalogue explains the names and dates, which is all the notice that it seems necessary to take of them.

The next class is deserving of greater attention. Some of the families therein mentioned, of whom insulated notices have been obtained, have been considered as independent sovereigns, though they can only be regarded as great hereditary feudatories. And in the darkness that overspreads all ancient Hindu history, and the eagerness with which any well-authenticated name or date is seized upon to fill up the dreary voids in the records of former days, it seems particularly useful to ascertain the precise power and relations of any remarkable names or titles that may be met with.

* A. H. 718. It is p. 389. † Ibid. p. 403, 4, 5. ‡ Ibid. p. 420.

The Jain Guru of Malkheir, who has already been quoted, enumerates four great nobles of the first rank as principal feudatories of the Kalyan state, and states generally, that there were besides sixteen of inferior grade.

The former were :—1st. Bijalenk Row, of Kalyan pattan, who is the same with the Vijala of the Kalabhurya Kula mentioned in the inscriptions.

2dly. Jyt Pal of Amba Jogi, or Jogae Amba. There were originally five brothers of this family, from whom descended the Pancham Jains, of whom 80,000 in one day became proselytes to Basavapa, and are now the Pancham Lingayats.

3dly. Tamra dhwaj, Raja of Latur, near Renapur, on the Manjera.

4thly. Gandantin Maharaja, of Bhir, near Kolapur. And to each of these some different office in the household was attached.

The inscriptions, however, make no mention of the second and third of these. Indeed their localities are so far removed from the scene where the collection was principally made, that the want of any record of their existence is not extraordinary.

The most conspicuous names met with in the inscriptions are,—

1st. The Kalabhurya family, of whom Vijala, or Bijalenk Row, was the most remarkable individual.

2nd. The Silaharas of Kolapur, Gandaditya or Gandavaditya ; one of this race is the Gandantin Maharaj of the Guru.

3rd. The Kadambas of Banawassi, one of the oldest and most distinguished families that occur.

4th. The Rattas of Sughandavati, now Sawandati, or Samadati.

THE KALABHURYAS.

The Kalabhuryas have already been noticed as having overthrown the ancient house of the Chalukyas to which they had long been subject. Several inscriptions of the family occur at Ingliswar, near Mudibahal (now the Jaghir of the Punt Pritti Niddhi). In one of these* a grant is made by Srí Karanam Nilkanth Nayaka, with the permission of * * * * Hegade Arasu, Mahá Mandaléswar, the son of the Kalabhurya Kula, lord of Kalanjapur, lord of the five Mahá Sabdas,† &c. (with the usual style and titles of a dependent noble), the

* Ins. No. 2 of VIII., the Chaluk series, p. 432.

† Lord of the Pancha mahá sabda, or five great sounds, is a title always joined with that of mahá mandaléswar, and never with that of the sovereign in any of the more modern inscriptions. It does, however, occur among the titles of Pulakesi in the copper inscription of Captain Jervis.

servant worshipping the feet of Bhulok Malla Chálukya, &c., in Saka 1051. He is also called Nada Hegade, or lord of the province, and though his name is effaced in the stone, there can be no doubt that it must refer to Permadi Déva, or Jogam Déva, the father or grandfather of Vijala.

But there appears to have been another family of Kalabhuryas, whose inscriptions occur at Rone and Sudi, near the Malapahari river, and of whom I find the following genealogies, of which I had made a memorandum at the time.

Sankam Dev Arasu of the Kalabhurya race, Lord of Kalanjrapura, &c.

- 1. Barund Bhupa Vikram
  - Bomarasu
    - Simharasu
      - Negalabarasu, married Sriya Dévi
        - Barunda Bhupa, or Brahmandan Bhupa, marrried 1. Madevi, 2. Demala Devi
          - (by 1. Madevi) 1. Vijala, 2. Vikaya
          - (by 2. Demala Devi) Vajra Déva — o
- 2. Bomendra Pal — o

Some difference occurs in another inscription at the third step in the line, where, instead of Bom Arasu, the name *Abarasu* occurs, and his son is designated as Nak arasu Simha Bhupa, which must be the same as the Simharasu in the former.

2d. The Silaharas, or Mahá Mandaleswars of Kolapúr, have been already made known by the translation of an inscription found, and published in the Transactions of the Bombay Literary Society.* Two inscriptions made by Gandaráditya Silahara, in Saka 1057 and 1065, besides incidental notices of them in others, furnish the following genealogies:—

Amarindra

- 1. Gonka
  - Narasimha
    - 1. Govala — o
    - 2. Ganga Déva — o
    - 3. Bellal Déva — o
    - 4. Gandaráditya, S. 1057-65
      - Vijayáditya
        - Bhoja Déva, S. 1113, *(Bombay Trans.)* S. 1137.
    - 5. Bhoj Rájá — o
- 2. Bhuvala — o
- 3. Kirtthi Rájá — o
- 4. Chandráditya — o

* By Dr. Taylor, vol. iii., p. 394.

The titles of the family in the above inscription are Gandaráditya Dèva, Mahá Mandalèswar, with the five great Sabdas, the great lord of Tagarapúr, like Narendra among the Silaharas, born of the race of Jimutavahanwa (a name of Indra), with the golden garuda ensign, a lion in the service of his master, &c. reigning at Walwada.* It was probably against Vijayáditya, the son of Gandaráditya, that Vijala undertook his last expedition immediately before his assassination by Basava. The circumstances are thus related by the Vijala Cheritra:— " The king having been warned in a dream that his death approached, sent for his ministers and great officers, and committed his queen and son to their charge. All obeyed the summons, except Suri Danda Natha of Kolapúr; and Vijala, to punish him, marched against him. But when he had reached the Bhima, messengers met him from Kolapúr, offering submission, and imploring forgiveness. The Rájá received them kindly, and sent his minister to settle the terms. The minister having gone to Kolapúr, returned with a false representation that Suri Danda Natha was bent on resistance, on which Vijala marched forward and besieged the place. The resistance was obstinate, but at last Vijala advancing in person, superintended the sapping of a part of the wall; and having gained an entrance, Suri Danda Natha submitted, paying tribute and offering gifts.†

In the third inscription of Simha Dèva Yuda,‡ in Saka 1137, that prince styles himself a Garuda to the serpent-like Bhoja, lord of Pannala.§ It is remarkable that both the Yadu and the Silahara had adopted the golden garuda as their ensign, which the prince seems unwilling to allow to his feudatory.

The most interesting circumstance regarding this family is their title of Tagara púra varadèswar, which from its geographical position being laid down by Ptolemy, becomes a point of great importance. As in the instance, however, of the title of the Kalabburyas of Kalanjara púra Varadeswar, it is probable that the use of the name of Tagara púra by the Kolapúr chiefs affords no clue whatever to the real position of this place.||

THE KADAMBAS.

The traditions of this family lay claim to great antiquity, and apparently with some reason, though not to the extent of their pretensions.

* Now Walwa, near Kolapúr † Vijala Cheritra, Book xii. ‡ Vol. ii., p. 174.

§ Pannala is the hill-fort above Kolapúr, a very strong place.

|| A native trader once told me he had passed through a town of this name on his way from Dharwar to Nagpúr, four kos beyond Kalburga. He described it as a good-sized town, with a bazaar, and a nala near it. But it was most probable he was mistaken, for had it been in that position it must have been observed by some European traveller who must have frequently passed that way.

An inscription at Kerguderi,* near Hangal, gives very full detail of the genealogy. The founder of the family was Mayura Varma, who was born on the earth like Siva,† the subduer of hostile rájás, the sacrificer of the furious elephant bound to the white stone pillar of the Himavat mountains, the performer of the Aswa Medha sacrifice, who brought the eighteen tribes of Durjas or Bráhmans from Ahi chhatra and fixed them in Kuntalavani, the lord of seventy-seven Simhasanams, &c.

Mayura Varma Déva
|
Krishna Varma Déva
|
Naga Varma Déva
|
Vishnu Varma Déva
|
Mriga Varma Déva
|
Satya Varma Déva
|
Vijaya Varma Déva
|
Jaya Varma Déva
|
Naga Varma Déva
|
Santa Varma Déva
|
Kirtthi Varma Déva
|
Aditya Varma Déva
|
Bhattaya Varma Déva
|
Jaya Varma Déva
|
Mayura Varma Déva, S. 956-66
|
1. Mavali D. (o) — 2. Tailapa D. 976. (o) — 3. Santi V. D. — 4. Joki D. (o) — 5. Vikram D.
|
(of 3. Santi V. D.) Tailapa Dêva, S. 999-1030
|
Namra Bhupa Permadi.

Other names occur subsequent to these in different inscriptions, as Santi Varma, Taila, Saka 1079, Karna, Sovi Déva, or Soméswar, and Vira Malli Déva, Saka 1163-73, but none of them have been referred to their exact places in the tree. Tailapa seems to have been the most powerful of the family in more modern times. He is described as "the servant existing at the lotos-feet of Tribhuvana Malla Vikram, the mahá mandaléswar, lord of the five great sabdas, lord of Banawassi

* Ins. No. 78 of VII., Chaluk, vol. i., p. 308.

† Sasanka Mavali.

púr; the worshipper of Jayanti Madhukéswar* sprung from the Kadamba Chakri, who was born from the eye of Siva, master of twenty-four cities, whose eye was in the centre of his forehead, the four-armed, the performer of the Aswa medha; this ornament of his race, celebrated for the monkey ensign and the simha signet whilst reigning over Banawassi and Panungul, and residing at Pantya pura,† &c." permits his Danda Nayaka, named Iswaram Eiya, to make a grant in Saka 1030.‡ The æra of Tailapa Kadamba holding the government of the Banawassi province is thus clearly established to be from Saka 999 to 1030. The number of names occurring before his in the genealogy is sixteen, and allowing thirty years to a generation, we may fix the age of Mayura Varma about Saka 500 or 520.

It would appear from the inscription given in the Appendix, that the Kadambas were one of the great tribes or families existing anterior to the Chálukyas, being mentioned as contemporaneous with the Rattas and Kalabhuryas, and their subjection was probably effected by Kirtthivarma, who must have lived nearly about the same time as Mayura Varma. They seem likewise to have asserted a degree of independence during the temporary overthrow of the Chálukya power, for their reduction is mentioned in the same authority as the exploit of Vikram I., the grandson of Tailapa Chálukya I.

Mayura Varma is still known by tradition, and is always quoted by the Haiga Bráhmans as the sovereign who introduced them into Kanara from Ahi Chhatra. When asked, however, where that place is, they profess their ignorance.

The descendants of Mayura Varma seem to have sunk into insignificance; no mention of them occurring till Saka 956, when they are styled rulers of Panangal. It seems doubtful whether they could ever be considered as mahá mandaléswars, as they are stated to have been under the subjection of or subordinate to other superior nobles. Thus Mayura Varma II., in 956, was head of the Hangal or Panangal alone, under the mahà mandalèswar Sriman Pegadi Madanaiya, the governor under Jaya Sinha Chàlukya of Santalgi and Banawassi, whose permission is requisite to confirm Mayura Varma's grant.§ Again, in 969, Chamunda Raya Mahá Mandaleswar, lord of Banawassi, is the Kadamba superior;|| and in 997 we find

* There is a celebrated temple at Banawassi in commemoration of Madhu Kaitabha, dedicated to Iswar, and another at the neighbouring town of Anivatti, sacred to the same deity as Kalabhiswar.

† I at first thought this to be the old name of Adur, but in the inscriptions at that place it is written Padiyur.

‡ Ins. No. 78 of VII., Chaluk, p. 308; also No. 7, do. do. p. 179.

§ Ins. at Adur, No. 10 of IV., Chaluk., vol. i., p. 34. Ditto, No. 2 of V., p. 52.

|| Ins. at Madur and Belgavi, Nos. 8 and 9 of V., Chaluk., p. 62, 3.

them still confined to the little district of Hangal under Ganga Permadi Bhuneka Vira Udayáditya Raja, lord of Kolapura and of Nandagiri, with the Gajindra ensign, &c., ruling over Banawassi, Santalgi, Mandala, and the eighteen Agraharas, by appointment of Bhuneka Malla Chalukya.*

In Saka 999, however, Tailapa Kadamba became governor of Banawassi and Panangal, and as this is the commencement of the reign of Vikram II., it is not impossible that the Kadamba chief received the dignity as a reward for assisting Vikram to dethrone his brother. From this time the Kadamba grants continue to be more numerous, but are confined entirely to Banawassi, Sunda, and Hangal, &c.

THE RATTAS.

Most of the inscriptions regarding this family occur at Samadati, near Pursghur. They were of the Jain faith, and had the following titles:—Maha Mandaleswar Katviryarasu, with the five maha sabdas, the great lord of Attalur pur, trivati turya nirgoshanam,† with the elephant signet, and the golden hawk and crocodile ensign, the sun of the Ratta Kula, whose genealogy is as follows:—

- Nanna Bhup
  - Vir Kartarasu, or Kala Sein Bhup
    - 1. Yama Bhup
      - 0
    - 2. Karna Bhup
      - Sankarasu, S. 970
        - Karna Bhup
          - 0
        - Sankamahisa
          - Katviryarasu, 1019.
    - 3. Kataviriya
      - Sri Sein Bhup, S. 979
        - 0

Some other names of great nobles occur, but not sufficiently identified with any particular place to give them much interest. Among these may be instanced Vir Vikrama and his brother Yutanrapal, maha-mandaleswar governing Gutawalal, now Gutal, on the Tungabhadra. He is styled the great lord of Ujjayani-pur, with the banian-tree signet, and the Vijaya standard, &c.; also a powerful family at Puttudkal, near Badami; Kartaviryarasu, governor of Belgave, under Ramachandra Yadu of Devagiri, &c.

Appendix, No. I.

Abstract of an Inscription at Yevur, or Ye-ur, in the Nizam's territory, on an upright stone at the Temple of Basavana, on the north side of the village.

The sun; the moon; two sitting figures; the lingam; a cow and calf.
"Salutation to the varaha form of Vishnu, who dried up the bright sea, and took up the afflicted earth on his right tusk.

* Ins. at Belgavi, No. 10 of VI., Chaluk., vol. i., p. 115.

† The signification of these terms is not known.

Also to Tribhuvana Malla, lord of the earth, the pure, the limpid fountain of honour, who became illustrious in the world.

Likewise to these celebrated princes, Vishnu verddhana Vijitaditya, and many other regal jewels who have been produced in the earth, commended throughout the world, who were of the Manavyasa Gotra, the children of Hariti, who received the distinguished gift of the white canopy from Kounsik ;* who are supported by seven mothers† who obtained the lofty present of the peacock fan from Kartikeya,‡ and the club ensign (Kunta dhwaja), and the boar signet (varaha lanshana) from the eminent favour of Bhagawan Narayana, who subdued all their enemies in an instant, the refuge of the whole world and of the inhabitants thereof.§

Such was the Chalukya race, the preservers of the splendour of Nala ; the strong-armed achieving conquest by their bow-strings over the great power of the inimical Kadambas, lofty powerful heroes to conquer, but not to be overcome, destroyers of the authority of the Ratta Kulas and of the Kalabhuryas.

In this race fifty-nine princes were born, having supported the kingdom and passed away, at Ayodyapura and other places ; and in this race also sixteen reigned conspicuously in the Dekkan or South.

Certain generations of enemies then intervened, when again the Chalukya vansa recovered their former possessions.

The flower of the shoot from the Chalukya tree became the retiring place in which Latchmi reposed herself. Like a thunderbolt to the mountain of his enemies, or a god subduing the Dyts, the sword of Jaya Sinha Walaba, celebrated in true history, destroyed the firmly-established recent kings.

He overcame the army of 800 elephants of the son of the moon of the Ratta Kuta Kula, named Krishta. He destroyed that prince, with his army of 500 elephants. Thus the goddess of royalty (raj Lachmi) was attained by the Chalukya race.

To him was born Ranna Ragaha, desirous of attaining the feet of Hara by his good deeds ; desirous of battle, of breaking the innumera-

* This is now borne by the Shenkar Bharti Swami, the Guru of the Smartha Brahmans.

† The Saptah Matraha, or seven Saktis, are Brahmi, Maheswari, Koumari, Vaishnuvi, Varahi, Indrani, Chamundi.

‡ The Solanki Gotracharya, as given by Colonel Tod, differs wholly from this enumeration of the Chalukya titles, viz. : Madwani Sacka ; Bardwaj gotra ; Gurh Lokoti nekas ; Saraswati nadi ; Shamveda ; Kapliswar Deva ; Karduman Rikeswar ; Teon. Purwar zenar ; Keonj Devi ; Maipal putra. I. 97.

In another inscription is the following verse : " Who shall relate the praise, the eminence, of the former Chálukyas, who acquired the Mayura Dhwaja from Tarakaveiri (Shenmukh), the Varaha mudra from Padma lochana (Vishnu), the lofty chhatra from Bhagavat Katiyayani, and with these insignia governed the world. Nagari, p. 107.

§ Shenmukh.

ble squadrons of the cavalry of his enemies, in which the swift strong horse, surmounted by his rider, is like unto an elephant.

His son was Pulakesi, the great lord of Watipipura, with a beautiful and pleasant countenance like that of Nishudan.*

To describe the praise of this Pulakesi, his body was like that of one whose hair stands (or bristles) up (kalita); he was the encourager of the learned; the performer of the Aswa medha sacrifice, distributing gifts of horses, elephants, and 2000 grants of land. His son was Kirtthi varma, the bright light of whose fame filled the earth like a dwelling place, the axe of the Kadamba pillar occupying the whole of the kingdom of Nala, which was without end, reaching from earth to Niriyan.

His brother was the fierce Mangal-isa, seizing upon the princes of the earth and ravishing the power of the Kalabhuryas (or Kalachuris) like a thunderbolt.

The son of his elder brother, with his family, succeeded to the kingdom of that Mangalis, who, governing the earth with righteousness, obtained the name of Satya Sri. Thus it happened in the Chalukya race.

He overcame the kings in all the four quarters, kings with more than 100 chariots; the jewel of the sea of good qualities, his aspect was the refuge of goodness.

To him was born Amara, the earth-lord, repressing the rajas contained within the boundaries protected by the Amaras (or tutelary deities of the earth).

His son, like a necklace of jewel-resembling-qualities, famed for the strength of his arm, was Aditya Varma, the acquirer of virtue, like the sea in splendour and excellence.

His son was Vikramaditya, who acquired the earth by his bravery. To him was born Yudh Malla, a prince in war like Yama.

His son was Vijayaditya, rushing into the fight alone, notorious throughout the four worlds, like Arjuna in conquest; his son was Vikramaditya, and his Kirtthivarma. After him the lord of the Chalukya power was

The son of the brother of Vikramaditya, famed like Bhima, destroying his enemies; from whom came Taila Bhupa Vikramaditya Bhupati. His son was Bhima Raja, terrifying his opponents.

Eiyana was born to him, for the enjoyment of Chalukya authority, the thunderbolt of Krishna Nandana; to him was born Vijitaditya, dazzling his opponents; a Vikramaditya in goodness, who married

* Vishnu.

Bonta Devi, daughter of Lachmana Raja, the ornament of the Bheda Vansa.

To them, as to Wasudeva and to Devaki, was born Wasudeva, and to the mountain-daughter (Parvati) and the crescent-supporter (Siva) was produced Gohari (Shenmukh). So was Taila Bhupam, surnamed Vikramaditya, to Vijitaditya and Bonta Devi. He acquired the little raj of the Ratta Kulas, which had again overspread the land, a race proud and regardless of their gurus, whose rajas this sprout of the royal tree destroyed and cut to pieces at the Rannasthamba; born like the Varaha awater for the preservation of the Chalukya Raj, snatching it from the Ratta Kula, as the earth was taken from the offspring of the Diti (Narkasura). He likewise humbled Chola and many other princes, &c.

The wife of Tailapa was Sri Jakabya, and their son Satya Sri, who married Ambeki Devi. His brother was Dasa varma, whose wife was Bhagavati Devi, and to them was born Vikramaditya, who broke the strength of the Kadambas.

His brother was the Jaggateka Malla, whose name was Jaya Simha raja.

His son was Ahawa Malla Deva, who, like an elephant in a garden of plantains, trampled on the lords of Malava, of Chola, and of Kanya kubja, and gained a fame like that of Tailapa, overcoming the most powerful of his enemies, and acquiring a fame like that of Arjuna.

His son, the ornament of the Chalukya race, was Bhuneka Malla, and his brother Vikramaditya Deva, surnamed Tribhuvana Malla, because he exacted homage from all worlds. They were like Hari Balaram and Soumitra Rama.

This genealogy of the Chalukya Chakravarti race is copied from a Tambar sasana; let them be honoured.

The inscription then continues in the composition of the modern writer:—" May Latchmapati Parvati pati, and Vakapati, preserve Ravi Deva the chief of the army."

He then shortly recapitulates the Chalukya vansavali, descendants from Brahma, who was produced in the lotos that sprang from the navel of Narayana, famed for the varaha avatar. " In which race many heroes having been born, Taila the Kali (of his time) was produced, constantly opposing his enemies; whose son was Dasa Varma, to whom was born the far-famed Vikrama, whose brother was Jaya Sinha Wallaba, whose fame is perpetual. His son was Ahawa Malla, and his Someswar, whose younger brother Kali Vikram brought the foreheads of Rajas to his feet."

The inscription then details the grant made in his reign, &c.

XV.— Proceedings of Societies.

Proceedings of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.

Wednesday, 31*st January* 1838.

PRESENT.

The Hon. Sir Robert Comyn, *President, in the Chair.*

Walter Elliot, Esq.
C. T. Kaye, Esq.
Ven. Archdeacon Harper,
J. Ouchterlony, Esq.
Captain M. J. Rowlandson,
Rev. W. Taylor,
Captain J. J. Underwood,
Robert Cole, Esq. *Sec. Asiatic Dept.*

J. C. Morris, Esq. *Secretary.*

The Secretary submitted to the Meeting, statements of the Society's accounts for the past year.

Abstract Statement of the Funds of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, from the 1*st January to the* 31*st December* 1837.

	Disbursements			Receipts.		
Balance in favour of the Society as exhibited in the Statement submitted to the General Meeting, held on the 15th March 1837.....	....	..	..	379	6	8
Total Amount of Subscriptions received from the 1st January to the 31st December 1837..	....	..	..	5903	15	1
Difference of interest in favour of the Society as stated in Messrs. Binny and Co.'s account, closed on the 31st December 1837.........	....	..	..	32	4	11
Messrs. Binny and Co.'s commission on amount of receipts..................................	59	0	6			
Remitted to Messrs. Wm. H. Allen and Co booksellers..............................	2636	5	4			
Pay of the Establishment....................	1475	11	8			
Postage....................................	136	5	0			
Government Customs on books from Calcutta	2	6	5			
Stationery	95	4	0			
Cooly Hire.................................	9	7	6			
Sundries..................................	81	7	4			
Expenses incurred in binding books..........	36	12	7			
Paid subscription and postage for the Bombay Courier, &c..............................	117	1	5			
Paid subscription and postage for the Bengal Herald, &c..............................	36	10	0			
Paid for six new book cases.................	616	0	0			
Paid subscription for the Fort St. George Gazette	12	0	0			
Paid for printing Catalogue of the Books in the Library	81	4	0			
Paid freight, &c. on a case of Books to London	10	6	0			
	5406	1	9	6315	10	8
Deduct disbursements................				5406	1	9
Balance in favour of the Society...............				909	8	11

Abstract Statement of the Funds of the Asiatic Department.

	Disbursements			Receipts.		
Balance in favour of the Society as exhibited in the statement, submitted to the General Meeting held on the 15th March 1837........	....	..	..	909	8	0
Difference of interest in favour of the Society as stated in Messrs. Binny and Co.'s account closed on the 31st December 1837.........	....	..	..	18	15	4
Total amount of subscriptions received from the 1st January to the 31st December 1837...	....	..	..	1065	0	0
Amount realized by the sale of the Madras Journal of Literature and Science.........	....	..	..	1865	8	0
Messrs. Binny and Co.'s commission on amount of Receipts..............................	29	4	11	....	..	
Paid to Mr. Pharoah for printing the 14th, 15th, 16th, and 17th Nos. of the Madras Journal of Literature and Science.........	1990	4	0	....	..	
Pay of the Establishment......................	738	6	11	....	..	
Sundries......................................	95	8	0	....	..	
Paid Freight, &c. on two boxes of Books to London..................................	25	15	6	....	..	
	2879	7	4	3858	15	4
Deduct Disbursements..................				2879	7	4
Balance in favour of the Society..................				979	8	0

The following Donations having been made to the Society since the last annual general meeting. The thanks of the Society were unanimously voted to the donors:—

Despatches of the Marquis of Wellesley, 3 vols.........Madras Government.
Horsburgh's Sailing Directory....... .... ditto
Auber's Rise and Progress of the British Power in India...................................... ditto
Aucher's Armenian and English and English and Armenian Dictionary, 2 vols. .... A. J.Johannes, Esq.
Annesley's Researches into the Causes, Nature, and Treatment of the most prevalent diseases of India..The Author.
Catalogue of the Library of the Royal Institution....J. Annesley, Esq.
Mahabharata, 3d vol......... ....Asiatic Society of Bengal.
Clarendon's History of the Rebellion, 8 vols...........Hon. Sir R. Comyn.
Burnet's History of the Reformation, 6 vols........... ditto
Burnet's History of his Own Times, 7 vols............. ditto
Segâra Malâyan or the Malayan Annals..............Lieut. T J. Newbold.
Adat Achi, or Usages of Achin......................... ditto
Historical fragments regarding Malayan States, &c... ditto
Genealogy of the Kings of Malacca, Johore, &c....... ditto
Maritime Code of Johore .... ditto
Hikayet Patina or History of Patina .... ditto
History of the Mahometan Empire in Spain ....William Elliot, Esq.
Stewart's Catalogue of Tippoo's Library............ ditto
Warren's Kala Sankalita.......................... ditto
Philosophia Naturalis....... .... ditto
C. Schaaf Nov. Testam Syriacum.................... ditto
Haughton's Menu.................................. ditto
Gulistan (Persian)......................... .... ditto
Pocket Dictionary (English and Tamil) .... ditto
Mahomet's Alkoran................................. ditto
Schmid's Introduction to English Grammar for Tamulians...................... ....The Author.

Aikin's Tacitus, Germany, and Life of Agricola	The Rev B. Schmid
Catalogue des Manuscrits Sanskrits de la Bibliothéque Impériale	ditto
Rammohun Roy on the Divine Authority of the Bible and the Vedas..............................	ditto
Oriental Languages in the Roman Character	ditto
Geographic D'Edrisi, Par P. Amédée Jaubert	The Author.
Five Copies of the Bombay Geographical Society—Proceedings of the..............................	Bombay Geographical Soc.
Specimen of the Gigantic Fern of the Neilgherries....	Lt.-Col. J. K. Limond.
Specimen's of Minerals, &c. from Goomsoor	Dr. Maxwell.
Manuel de L'auditeur du Cours D'Hindoustani	M De Tassy.
Les Œuvres de Wali traduction et notes	ditto.
Earl Stanhope's address to the Medico-Botanical Society..	Medico-Botanical Soc.
Census of the Armenian population of the City of Calcutta..	Johannes Avdall, Esq.

It was announced that the following gentlemen have been elected members of the Society.

The Right Hon. Lord Elphinstone, G.C.H.	R. B. Sewell, Esq.
J. H. Young, Esq.	W. McTaggart, Esq.
B. Cardozo, Esq.	J. C. Fuller, Esq.
C. T. Kaye, Esq.	S. Rogers, Esq.
George Harding, Esq.	A. W. Pruen, Esq.
J. L. Geddes, Esq.	Captain G. W. Whistler.
T. C. Jerdon, Esq	Captain Boldero.
Captain Maitland, A. D. C.	Captain James Macdonald.
James Kerr, Esq.	G. P. Monckton, Esq.

During the past year the Society has lost 18 members by death, retirement or departure for Europe.

The meeting proceed to elect four members for the Committee of Management for the ensuing year, in succession to Major Keighly, Æ. R. McDonell, Esq. Ven. Archdeacon Harper and J. Annesley, Esq.—when C. T. Kaye, Esq., J. Ouchterlony, Esq. and Captain Underwood were duly elected and the Ven. Archdeacon Harper re-elected.

The Secretary to the Asiatic Department lays before the meeting a letter and Report from the Rev. W. Taylor, employed on the examination of the MACKENZIE MSS. (*see* 1*st Art. of this Number*).

The Meeting expressed great satisfaction at the progress made by Mr. Taylor in examining, collating and restoring the Mackenzie Manuscripts—and

Resolved, that a copy of his letter and the volume of the restored manuscripts be forwarded for the information and inspection of Government.

It having been ascertained that the name of Baron Von Hammer, who was several years ago elected an Honorary Member of the Society, has been inadvertently omitted from the list—it is

Resolved, that his name be added in the next Catalogue, and that a letter of explanation be addressed to the Baron on the subject.

The thanks of the Meeting were voted to the Honourable the President, for his able conduct in the Chair.

Asiatic Society of Bengal.

2d August 1837.—Adverting to the edition of the Miscellaneous Essays of the late Mr. H. T. Colebrooke announced among the presentations to the library this evening, Mr. J. T. Pearson called to the attention of the meeting that although it was impossible now to return thanks to the illustrious author for what might be called his dying bequest to literature, the Society might justly place on record some appropriate acknowledgment of its great obligations to this eminent orientalist, and some expression of its regret at the termination of his honourable and useful career. He thought it would be an excellent plan to follow the example of the Institute at Paris, in its eulogistic memoirs on the death of eminent members—such as those pronounced by the Baron Cuvier on so many occasions.

The meeting concurring in Dr. Pearson's proposition which was seconded by Mr. Hare, and the Vice-President, Dr. Mill, having acceded to the request of the meeting to embody in their present resolution an abstract of the services rendered by Mr. Colebrooke to the Society, and to Asiatic literature in general,—it was accordingly

Resolved unanimously, that the Asiatic Society cannot place on its shelves this last donation from Henry Thomas Colebrooke, so long one of its most distinguished members, without recording a tribute of affection for his memory, of admiration for his great talents, and regret for the loss sustained by oriental literature through his lamented death.

" Mr. Colebrooke was proposed as a member of this Society in the year 1792, and his first essay " on the duties of a faithful Hindu widow" was read in the last season of Sir William Jones' occupation of the chair, in April 1794. Though on an insulated subject only, which various circumstances however render deeply interesting, this short essay well exemplifies the manner in which he exhausts every subject of that nature that he undertakes: and is a happy prelude to that series of splendid contributions to the society, which in profundity of acquaintance with all subjects of Indian literature and science,—in the union of the most extensive erudition with the most chastened judgment, and an accurate scientific acquaintance with the several subjects which his essays collaterally embrace, are unsurpassed by those of any other contributor to our Researches,—or by any who, either before or since, have pursued the same unbeaten paths of literature.

His next essay was the " enumeration of Indian classes," or (as we commonly term them) castes—in the 5th volume of the Researches; an able and excellent elucidation of a subject of no common interest. And this, after some less important contributions, was followed by the essays on the Religious Ceremonies of the Hindus, and on the Sanskrit and Prakrit languages, which appear in that volume and in the 7th—essays which would be of themselves sufficient to place the author in the highest rank of oriental scholars,—and which must long continue to form the best text books of those who wish to investigate the depths of Indian literature and religion.

The translation of one of the more recent inscriptions on the Delhi lát, which appears also in the 7th volume of the Researches, is chiefly interesting as being the commencement of the author's more extensive researches into monuments of the same kind in our later volumes; he was among the first to point out the great importance to the knowledge of ancient India of a pursuit, the enlargement of which is daily increasing our stock of historical information. The " account of certain Muhammadan sects" in the same volume contains some valuable particulars respecting the origin of the curious race so well known in the west of India under the name of *Bohras*; and proves that in the midst of his accurate study of the more secluded literature and monuments of the Hindus,—the author was versed also in the learned records of Western Asia.

The dissertation which bears, perhaps most of all, the stamp of the profound Sanskrit learning of the author, is that on the Vedas in our 8th volume; a work which, though necessarily leaving much undone that is yet required towards furnishing a complete analytical index to those records of the ruder language, and oldest worship of the Hindus, —has found none to second, much less to complete, or to supersede the masterly outline of their contents which is here presented to the inquiring student. In this, as in the other essays of Mr. Colebrooke,—the reader feels that it is not a mere philologist, or collector of ancient records that he is consulting,—but one whose critical sagacity weighs well the value, the age, and the import of every authority that he alleges: and whose statements in consequence, may be received with the most entire respect and confidence.

The later volumes of the Researches are adorned not only by the elaborate " Observations on the Jains" in which very respectable classical erudition is brought to aid profound Indian research,—and the learned and interesting Essay on Sanskrit and Prakrit poetry,—but by the

author's articles on Hindu astronomy. To this deeply interesting subject of inquiry none has so completely brought the qualification desiderated by Ideler, the union of Sanskrit learning with competent astronomical science. The account of the Indian and Arabian divisions of the Zodiac in the 9th volume,—and the essay in the 12th on the notions of the Hindu mathematicians respecting the precession of the equinoxes and the motions of the planets,—are most valuable contributions to our knowledge on this subject. They are the best corrections to the extravagant notions of Indian antiquity which the preceding speculations of Bailly and others had deduced from imperfect notices of the Hindu observations: and also to the crude and fanciful speculations with which a writer on the opposite side, the late Mr. J. Bentley, had unhappily adulterated some very valuable and interesting calculations.

Such, with some articles of less moment, but all deserving perusal, are the contributions of Mr. Colebrooke to the Researches of the Society, of which he was elected Vice-President on the 5th of October, 1803, and President on the 2d of April 1806,—an office which he continued to fill until his departure to England in 1815. But it would be unpardonable to omit all mention of the works separately published by him while resident here: particularly the Sanskrit Grammar, with its very able critical preface,—the edition of the ancient Sanskrit vocabulary, the *Amera Cosha*, to the interpretation of which much botanical knowledge is made to contribute;—the very erudite and ingenious work on the Algebra of the Hindus,—and the Digest of Hindu Law, a standing monument of the professional value of the writer, and of his skill at the same time as a jurist and an oriental scholar.

Neither would it be pardonable to omit all mention of what has been contributed by Mr. Colebrooke to the same cause since his return to England, where he acted zealously as the Society's agent until age and infirmities compelled him, in 1830, to relinquish the duties of the office to which they elected him. This period is signalized by the erection of the Royal Asiatic Society, to which, as their first President, Mr. Colebrooke delivered his inaugural discourse in March 1823, and of whose transactions his articles may be regarded as the principal ornament. Of these the essays on the Philosophy of the Hindus in its five principal divisions is unquestionably the most important, relating as they do, to a subject which none who studies the history of the human mind can regard otherwise than with the greatest interest,—and written with an ability, a mingled profundity and clearness, which chal-

lenges comparison with the best of his preceding works. A perusal of these five essays—as they were successively published in the two first volumes of the R. A. S. Transactions, or as they are now republished with the best of his earlier essays in the selection now presented to our library,—will at once convince every discerning reader of their immeasurable superiority to any thing that had been before published on the same subject."

6th September 1837.—Sir Edward Ryan, adverting to the approaching retirement of the Rev. Dr. Mill to Europe, suggested to the Society the propriety of paying some compliment to this distinguished scholar expressive of their feeling on the occasion. He would not now expatiate on the Vice President's title to such a tribute, because if his proposition were adopted, this pleasing task would be more ably performed and more appropriately conveyed in the name of the Society at large ; he therefore moved first :

That an address be presented to Dr. Mill, expressive of the loss which the Society will sustain by the departure of a member so eminently qualified by his profound knowledge of the languages of the East to aid and assist in the objects and pursuits of the Society.

Mr. W. H. Macnaghten had great pleasure in seconding any proposition to do honor to Dr. Mill. In no member had greater erudition ever been witnessed, nor had any converted profound learning to uses calculated more to benefit the country and to dignify the study of oriental learning. Addresses had been very rarely presented, but on such an occasion the practice would be more honored in the observance than in the breach.

The motion being carried *nem. con.* was followed by a proposition from the President,

That Mr. W. H. Macnaghten, be requested to draw up the address, to be presented to Dr. Mill, at the next regular meeting, or at a special meeting should he be unable then to attend.

Sir B. Malkin, seconded this motion. Though his Indian acquaintance with Dr. Mill and his capability of appreciating his local studies was less than that of other members, he had enjoyed his friendship at more remote date, and at a greater distance than many. The wide scope of his friend's knowledge embraced the east and the west. It had been observed of him at college, that his knowledge was equally

remarkable for area and for depth : certainly its depth had not diminished by his sojourn in India, while its area had wonderfully extended.

This motion being likewise carried, Sir Edward Ryan prefaced his third proposition by reading the following eloquent passage from Dr. Wilson's reply to the address presented to him on his departure in December, 1832.

" If I can judge of your sentiments by my own, I can fully appreciate the motives which induce you to seek to preserve memorials of those who have taken an active part in the labours of the Society. One of the most interesting decorations of the room in which we are accustomed to assemble is to me, to all, the portrait of our illustrious founder ; and I am sure you will agree with me that the apartment would possess a still dearer interest were such decorations multiplied ; did the countenances of Colebrooke, Wilford, Wilkins, and other distinguished members look down complacently upon the labours of their successors. I need not add, how irresistible are such influences upon the human mind, and how well calculated are such memorials to give wholesome stimulus to youthful energies. It is not from a merely selfish motive therefore that I accede to your request, but in the hope that even in this way I may contribute, however feebly, to the great ends of our Institution ; at the same time I am not insensible of the kindness which has prompted the proposal, and if I do feel vain it is that you should have thought me worthy of the honour of being perpetually, as far as any thing human is perpetual, present among you."

He concluded by proposing,

That to meet the wishes of his numerous friends anxious to subscribe for the preservation of a memorial of Dr. Mill in the Society's rooms, he be requested on his arrival in England to sit for his picture to some eminent artist.

The Secretary in seconding this propositiou, said he had been called on at a late festive meeting to bear testimony to Dr. Mill's great talents and learning, and had felt some humiliation at his total incompetency to answer such a call, for indeed it would have been naught but presumption in him to speak to merits so far beyond his criticism. Happily in these rooms no such testimony was required, for here all knew his learning and his value. He could not however omit to make public acknowledgment of the kindness and aid he had always received from Dr. Mill, in his capacity of Editor of the journal ; to which Dr. Mill's contributions had been ever among the most valuable. A circumstance worthy of mention had enabled him to hear what the pandits thought

of his attainments in Sanskrit, for Dr. Mill was so scrupulous of accuracy that he never put a page of his own composition to press until it had undergone the scrutiny of several natives of learning. On asking an opinion of one of the most learned of these, Kamala'kan'ta had begged to be allowed to express it in verse, and he now held in his hand what might really in some degree be regarded as a diploma of the Vice-President's Sanskrit proficiency. " Where, said the pandit, among all the English who have studied our language, was there yet one who could compose a poem in the style and language of our most classical ages ? Verily he is Ka'li'da'sa come again among us."

4th Oct. 1837.—The President in compliance with the resolution of last meeting, rose, the members also standing, and read the following

Address to Dr. Mill.

The Asiatic Society, to the Reverend W. H. Mill, D. D. Principal of Bishop's College, their Vice-President.

Reverend Sir,

The intelligence of your intention to return immediately to Europe has been received by us with feelings of deep regret, impressed as we are with the conviction that India is about to sustain, by your departure, a loss which cannot easily be repaired.

It will rest with higher authority than the *Asiatic Society*, to bear witness to the unwearied zeal and fervent piety by which you have been uniformly distinguished in the discharge of the sacred duties committed to your care; but it is peculiarly our privilege to testify, in the most public manner, our sense of the benefit we have derived from your abilities and learning, as well as to convey some parting token of our esteem and respect to a Scholar whose presence among us we have always regarded with feelings of pride and satisfaction.

It is now sixteen years since you arrived in this country. While yet a young man, you had established for yourself a literary reputation of no common order, having excelled on an arena where excellence could have been won only by the united efforts of genius and industry. We hailed your arrival therefore with no ordinary feelings of satisfaction, indulging in the hope that the classical languages and

literature of the East would receive from you a share of that attention which had already been so successfully devoted to the learning and science of the West. This hope has since been amply realized.

The Journals of our Society contain abundant evidence of your patient research, of your correct judgment, and of your profound erudition.

Your translation from the Sanskrit of the first part of *Calidasa's Uma,* affords indisputable proof of your skill as a poet and a commentator; while your qualifications as a historian and a philologist have been clearly established by your restoration, with valuable critical and historical notices, of the *Allahabad Inscription,* and by your full and accurate translation of the *Shekhawati Inscription* found in the temple of *Harsha* at *Oncha pahar,* and of that discovered at *Bhittri* near *Ghazipore.* In your comments on the Macan Manuscript of the *Alif Leila,* we trace at once the minute accuracy of an experienced critic and the refined taste of an accomplished scholar.

In your Arabic Treatise on Algebra, and in your Hebrew collation of the Psalms in the same language, we have a durable monument of your learning and piety. But the most valuable of your literary undertakings is your Sanskrit Poem, the *Christa Sangita.* In that beautiful work the praises of our Redeemer have been for the first time sung in the sacred language of the *Vedas.* It is your peculiar boast that you have caused the purest doctrines to flow in the stream of this noble language. To the whole body of the learned Hindus you have thus rendered accessible the sublimest truths, by conveying them in a channel to which, as to their own venerated river, they ascribe the power of purifying all it touches. To a mind like yours this must be an inexhaustible source of gratifying reflection.

But, Sir, we feel that we should be doing you an injustice, were we to describe at greater length, the fruits of your studies already before the public. We feel that no conception can be formed of the stores of your capacious mind from the comparatively small samples of your labours which have been given to the world. We feel that to the unobtrusive nature of your character is owing the infrequency of your appearance as an author, and we know that you have assiduously improved your great faculties;—that your scientific attainments are on the most extended scale;—that as a Hebrew Scholar you were early distinguished;—that your knowledge as a modern Linguist may be said to be universal;—that you are equally familiar with the astronomy of the *Siddhantas,* the mythology of the *Puranas,* and the mystical doctrines of the *Vedas;* while there is no department of the

literature and science of Arabia, that has escaped your scrutinizing research.

We trust that, in the leisure of dignified retirement, you will be enabled to put forth the maturer fruits of your rich and highly cultivated mind. We are confident that your well-earned reputation will be sustained by whatever you perform; and we are sanguine enough to hope that our country may now boast of possessing an Englishman, the depth and variety of whose oriental studies are not surpassed by any (numerous and distinguished as they are) of the Scholars of the continent.

We cannot allow this opportunity to pass without assuring you of the deep sense of obligation we feel towards you for your unremitting attention to the duties of your station as *Vice-President* of our Society, and for the alacrity with which on all occasions you have afforded us the benefit of your opinion and advice, and the aid of your learning and judgment on the difficult and continually recurring references that have been submitted to our consideration.

We are in some degree consoled for your loss to ourselves by reflecting that, here you have no more to learn:—that though your acquirements are beyond the standard, which is ordinarily reached in the longest and most laborious life, you are yet in the vigour of manhood; and that you are about to return to a land where you will meet with the distinction, which is due to abilities so eminent and to attainments so various.

It is our earnest desire that you will gratify us by sitting for your Portrait as soon after arrival in England as may be convenient to yourself. For the Members of our Society who have the happiness to know you, no token of re miniscence is requisite; but the wish is reasonable that our Hall should be decorated with the resemblance of one, who, while among us, was so useful and so distinguished a Member of our Society.

(Signed) Edward Ryan, *President.*

The Reverend Dr. Mill read the following reply, the President and members still standing.

Mr. President,

The address which you, in the name of this Society, have done me the high honour of presenting to me, is one which I cannot rise to

answer without some feelings of doubt and embarrassment. For I fear to incur the imputation of affected modesty on the one hand,—or on the other, what I would equally wish to avoid, the appearance of slighting in any degree the deliberate judgment of an assembly like this,—were I to give expression to my actual sentiments, on hearing the terms of strong and noble eulogy with which you have dignified my scanty contributions to your learned stores, and the comparatively humble attainments from which those contributions have proceeded. But whatever may be the real value of these labours and attainments,—I feel, and must ever continue to feel, the great obligation which your praise imposes on me, of aiming to resemble as far as I may, that standard of excellence which your too favourable judgment has inferred from the specimens of me already before you. I must ever consider it among the strongest additional incentives to the assiduous cultivation of that knowledge, in promoting which the Asiatic Society has long held so distinguished a place: a cause which I cannot but consider as intimately connected with that of mental improvement and true religion.

I have long been impressed with the conviction that as an accurate knowledge of the intellectual state of any people must precede and accompany all enlightened efforts for their amelioration,—so to attempt that amelioration by appealing entirely to the lower principles of our nature, the love of comforts aud luxuries and the like, while we disregard and despise the forms, however imperfect they may be, in which their own ideas of mental and moral elevation are embodied—is to overlook a most essential element in the problem of human improvement,—to slight equally the spiritual and high nature of man, and the history of our own gradual progress to the eminence we have reached. This would be true, even if the language and literature in which these ideas were incorporated by the natives of this country were far inferior to what they are known and acknowledged to be by the most accomplished spirits of civilized Europe,—the one nearly unrivalled for its powers of combination and expression—the other distinguished by a peculiar grace and tenderness of sentiment, and in the higher flights of speculation into regions where man requires better guidance than his own reason can impart—characterized, even when most tarnished by error, by a singular acuteness and profundity, as well as grandeur of thought. Now if it be a mistake, in matters of religion particularly, to avail ourselves of what is good and just in heathen theology, with a view to its rectification by revealed truth; it is a mistake certainly in which the Apostle of the Gentiles has led

the way, as any one may see who observes his appeal not only to the ethical but the theological poetry of heathenism—even when most nearly treading on the verge of that same Pantheistic sentiment which characterizes the theology of heathen India: and if any precedent could be wanted after this inspired authority, we might find it in the course taken by all the great lights of the Church, the Basils, the Chrysostoms, the Augustines,—when the expansive power of Christianity, with much of its primitive fervour, was seen in close and *more equal* juxta-position with the faded yet still conspicuous splendours of Western Gentilism. These considerations (if authority were needed where the reason of the case speaks with sufficient distinctness) had weight with me in the conception of that work which the Society has honoured with such distinguished approbation. I am sensible that to conceive and to execute are very different things, and I cannot venture to take to myself all which your kind judgment has been led, perhaps too readily, to transfer from the one to the other: yet I cannot see the manner in which learned natives have received many portions of this work,—I cannot see the unhesitating manner in which their sentiment has been adopted in this assembly, including some whom only the increased complexity of public affairs prevents from marching in equal steps with the Colebrookes and the Wilsons of former days,—without satisfaction at the result of the experiment, and hope for the future.

I would not however be thought to limit my interest in the Researches of the Society to matters of this high bearing: for no speculations into either the works of nature, or the monuments of man, are without their proper claim to attention: and just and reasonable as it is to inquire into the solid utility of any pursuit we undertake,—it never appeared to me either wise or worthy to ask at every turn what special usefulness, or bearing on present concerns, may appear in each part or section of the study before us. In science we know that things, which were once thought to be mere food of learned and abstract mathematical speculation, have turned out in the progress of knowledge to subserve the most practical purposes; and with respect to those literary and antiquarian researches, which form the more proper object of this Society,—while nothing that gives us clear knowledge of the history of man and the progress of mind ought to be deemed unimportant by us,—we must remember also that we cannot exactly determine beforehand how far any fragment or morsel of history may conduce to that clear knowledge in the end. In investigating the former history of India, where from the almost total ab-

sence of written documents, we must needs proceed by such fragments and morsels,—it is very necessary to bear this in mind. With respect to my own occasional share in these researches,—of which you have made such kind and flattering mention,—I fear that what I have succeeded in deciphering has scarcely adequately repaid the labour bestowed: my own judgment could never admit the idea, which some even of considerable eminence in these pursuits would have led me to entertain as probable, that the classical period of Indian history had been attained: I adopted at length firmly, however reluctantly, the conviction which both internal and external evidence forced upon me, that the monuments in question belonged to a much darker as well as more recent age. A better fortune, as well as a higher merit, has characterised the efforts in the same kind of another Member of the Society now present; whose happy researches on other monuments, conducted under much greater disadvantages in every way than mine, has finally led to a conclusion, which I think all but certainly established, that they belong to and illustrate a most classical and important part of the history of this country. I beg my friend the Secretary's pardon for talking thus of disadvantages; for it appears almost ungracious to notice what, however enhancing, as it does, the eminent inductive sagacity that he has displayed in his discovery, might seem also to derogate from the universality of his varied and extensive knowledge. I would not have mentioned them—had I not been convinced that he needs but the *will*, if he could find the leisure, to rid himself entirely of them. I know at least that if he could bend his thoughts that way, he needs far less time than most men to add a critical knowledge of the learned languages of the country, so auxiliary to his successful researches in the coins and monuments of India,—to the many other distinguished merits which have made his Journal of our Society, even in his sole portion of it, the object of attention to literary Europe. Of his value as a Secretary, I cannot possibly say more than that he has caused even the loss of the transcendent merits of Wilson to cease to be thought irreparable by us.

My business, however, as I must not forget, is not to express my sense of the merits of other Officers of this Society (however incidentally forced on my notice in this instance),—but to acknowledge your kind opinion of myself and to accede thankfully to the proof of it contained in your parting request to me. To be associated in this manner in the remembrance of this Society with its illustrious founder, and the many others whose contributions have conferred ornament and dignity on its proceedings,—is what I cannot suffer even my sense

of comparative unworthiness to prevent esteeming a great source of gratification. To you, Mr. President, who have so long added to the duties of your high station in this settlement, a zealous and able administration of the affairs of this Society,—as well as to your colleague in both these respects, of whom, being now absent, (as I regret to perceive), from illness, I may speak with more freedom,—as one whose distinguished scientific and literary attainments add lustre to his other excellent qualities,—I am well pleased to leave this token of recollection of myself, whose friendship with both was begun in the academic associations of a far different clime from this, in which again I hope we may yet meet. To the other very learned and able Vice-Presidents, and to all, whether countrymen or natives of India, who may be led to take interest in the works you have mentioned with such marked approbation,—I am glad to present, when absent, some memento of my endeavours, such as they are, to instruct or to aid them. Once more, Gentlemen, I thank you for your kind sentiments towards me, and bid you most heartily farewell.

(Signed) W. H. Mill.

Resolved, on the motion of Mr. W. Cracroft, that the address and the reply be entered in the outcoming volume of the Researches.

The president moved that all farther business be adjourned to the next meeting.

The Secretary however ere he closed his boxes begged to be allowed to mention one subject of their contents, that he could not allow himself to withhold from his friend Dr. Mill, after the warm interest he had just evinced in the progress of the investigations upon which he had lately been engaged. A letter just received from the eminent Pali scholar Mr. Turnour gave confirmation the most unequivocal to the supposition just expressed by the learned Vice-President that the *lats* were monuments of the classical age of Indian history. Mr. Turnour had proved from an ancient Pali work that Piyadasi was no other than the great Asoka himself, who reigned paramount over India in the third century before the Christian era.

Neither could he allow himself to sit down on this last opportunity of enjoying Dr. Mill's society without shewing him what would nearly interest him in an equal degree, the fruit of Captain Burnes's researches on the Indus, the first Sanskrit monument we had seen from

the neighbourhood of *Kabul*—a transcript of a mutilated inscription from *Hund*, 20 miles above *Attock*.—Capt. Burnes had left the white marble slab on which it was engraved at *Peshawer* awaiting the Society's instructions. He hoped by the next meeting to give a further account of it.

The members present then shook hands with Dr. Mill, and the meeting adjourned.

1st November 1837.—Read extract of a letter from Dr. Royle, Secretary to the Geological Society, transmitting under charge of Captain H. Drummond, the gold Wollaston medals awarded to Dr. Hugh Falconer and Captain P. T. Cautley, for their fossil discoveries in the *Sewalik* range.

Professor Royle was induced to send these tokens of the approbation of the Geological Society (of which he has recently been nominated an office-bearer), thinking his associates in the Asiatic Society would like to see them : but more particularly because the excellent paper on the Sivatherium was first made public in their Researches, and it would be the best proof of the interest taken by the scientific at home in the novel and interesting discoveries in which so many members of the Society have been successfully engaged within the last four years.

Dr. Royle quoted the following extract from Mr. Lyell's address delivered at the Anniversary Meeting of the Geological Society on the 17th February, 1837.

ORGANIC REMAINS.

" Gentlemen, you have been already informed that the Council have this year awarded two Wollaston medals, one to Captain Proby Cautley of the Bengal Artillery, and the other to Dr. Hugh Falconer, Superintendent of the Botanic Garden at Saharunpore, for their researches in the geology of India, and more particularly their discovery of many fossil remains of extinct quadrupeds at the southern foot of the Himalaya mountains. At our last Anniversary I took occasion to acknowledge a magnificent present, consisting of duplicates of these fossils, which the Society had received from Captain Cautley, and since that time other donations of great value have been transmitted by him to our museum. These Indian fossil bones belong to extinct species of herbivorous and carnivorous mammalia, and to reptiles of the genera crocodile, gavial, emys, and trionyx, and to several species

of fish, with which shells of fresh-water genera are associated, the whole being entombed in a formation of sandstone, conglomerate marl, and clay, in inclined stratification, composing a range of hills, called the Siwalik, between the rivers Sutledge and Ganges. These hills rise to the height of from 500 to 1,000 feet above the adjacent plains, some of the loftiest peaks being 3,000 feet above the level of the sea.

" When Captain Cautley and Dr. Falconer first discovered these remarkable remains their curiosity was awakened, and they felt convinced of their great scientific value; but they were not versed in fossil osteology, and being stationed on the remote confines of our Indian possessions, they were far distant from any living authorities or books on comparative anatomy to which they could refer. The manner in which they overcame these disadvantages, and the enthusiasm with which they continued for years to prosecute their researches when thus isolated from the scientific world is truly admirable. Dr. Royle has permitted me to read a part of their correspondence with him when they were exploring the Siwalik mountains, and I can bear witness to their extraordinary energy and perseverance. From time to time they earnestly requested that Cuvier's works on osteology might be sent out to them, and expressed their disappointment when, from various accidents, these volumes failed to arrive. The delay perhaps was fortunate, for being thrown entirely upon their own resources, they soon found a museum of comparative anatomy in the surrounding plains, hills, and jungles, where they slew the wild tigers, buffaloes, antelopes, and other Indian quadrupeds, of which they preserved the skeletons, besides obtaining specimens of all the genera of reptiles which inhabited that region. They were compelled to see and think for themselves while comparing and discriminating the different recent and fossil bones, and reasoning on the laws of comparative osteology, till at length they were fully prepared to appreciate the lessons which they were taught by the works of Cuvier. In the course of their labours they have ascertained the existence of the elephant, mastodon, rhinoceros, hippopotamus, ox, buffalo, elk, antelope, deer, and other herbivorous genera, besides several canine and feline carnivora. On some of these Dr. Falconer and Captain Cautley have each written separate and independent memoirs. Captain Cautley, for example, is the author of an article in the Journal of the Asiatic Society, in which he shows that two of the species of mastodon described by Mr. Clift are, in fact, one, the supposed difference in character having been drawn from the teeth of the young and adult

of the same species. I ought to remind you that this same gentleman was the discoverer, in 1833, of the Indian Herculaneum or buried town near Behat, north of Seharunpore, which he found seventeen feet below the surface of the country when directing the excavation of the Doab Canal.*

" But I ought more particularly to invite your attention to the joint paper by Dr. Falconer and Captain Cautley on the Sivatherium, a new and extraordinary species of mammalia, which they have minutely described and figured, offering at the same time many profound speculations on its probable anatomical relations. The characters of this genus are drawn from a head almost complete, found at first enveloped in a mass of hard stone, which had lain as a boulder in a water-course, but after much labour the covering of stone was successfully removed, and the huge head now stands out with its two horns in relief, the nasal bones being projected in a free arch, and the molars on both sides of the jaw being singularly perfect. This individual must have approached the elephant in size. The genus Sivatherium, say the authors, is the more interesting, as helping to fill up the important blank which has always intervened between the ruminant and pachydermatous quadrupeds, for it combines the teeth and horns of a ruminant, with the lip, face, and probably proboscis of a pachyderm. They also observe, that the extinct mammiferous genera of Cuvier were all confined to the Pachydermata, and no remarkable deviation from existing types had been noticed by him among fossil ruminants, whereas the Sivatherium holds a perfectly isolated position, like the giraffe and the camels, being widely remote from any other type."

Resolved, that due acknowledgments be addressed to the Geological Society for their courtesy in entrusting the Asiatic Society with the honorary medals awarded to two of their associates, and that they be immediately forwarded with appropriate congratulations to Seharunpore.

* Journal of Asiatic Society, Nos. xxv. and xxix. 1834. Principles of Geology, 4th and subsequent editions. See Index, Behat.

Royal Asiatic Society.

May 26, 1837.—Mr. Ashburner, who had kindly favoured the Committee with his attendance, read a paper drawn up by him, on the internal trade of Bombay in cotton, salt, &c., and on the state of the roads and modes of conveyance in general throughout that Presidency.

Resolved,—That this Paper be printed in the Proceedings of this day, and that the thanks of the Committee to Mr. Ashburner for his communication, be recorded.

Resolved,—That a copy of Mr. Ashburner's Paper be sent to the Court of Directors, with a request that an abstract statement of the roads constructed at the several Presidencies of India within the last twenty years, be furnished to the Committee.

Memorandum respecting the Internal Trade and Communication of the Presidency of Bombay, by Geo. Ashburner, Esq.

Within the last few years the internal trade of western India has exhibited unusual signs of activity. An intercourse has long been established between the provinces on the Nerbudda and the Taptee, and the port of Bombay; but until 1830 it was confined almost entirely to the conveyance of salt for the consumption of central India. This article was carried on bullocks from the sea-coast to the town of Oumrawutty in Berar, a distance of near six hundred miles.

As the bullocks were sent down from Oumrawutty unladen, it occurred to an enterprising native in the year above-mentioned, to load some of them with the cotton of the country, which had been previously carried to Calcutta, *via* Mirzapore and the Ganges, and the experiment succeeded so well that no less than 10,000 loads of the article were brought to Bombay the following year.

The price it then sold for (64 rupees a candy) seemed sufficiently remunerating; for the quantity brought to market was steadily and rapidly increasing. The great rise, however, in the price of cotton all over the world, which took place in 1834, and 1835, and the high prices which continued last year, gave an additional stimulus to the cotton dealers and cultivators of Berar; and the result was, the importation into Bombay last year of no less than 90,000 bullock loads of 240-lbs. each, of the article from the above district.

The great fall which has since taken place in the value of cotton will no doubt check this important branch of commerce. If properly managed and encouraged, however, there is every reason to suppose that it will nevertheless go on increasing at a steady pace. The fact is, there is no portion of the world at present which seems capable of producing cotton at so cheap a rate as central India.

The soil throughout the greater portion of the country is uncommonly rich, and its value is but trifling.

The exact amount of the assessment I have not been able to ascertain, but from all that I could learn it was not more for cotton lands than 4 annas (about 6*d.*) per bigha. In the next place labour in central India is cheaper than in almost any other portion of the world; the wages of an able bodied man being only 3 rupees per mensem. It has been estimated therefore that Berar cotton may be cultivated profitably for 30 rupees per candy, or for rather less than a penny a pound! Hence the only obstacle which exists to its production to a much greater, I may indeed almost say to an unlimited extent, is the difficulty of transportation from the place of cultivation to a market.

To give an idea of the extent to which this operates, it is necessary in the first place to state, that the price of transportation at present amounts to from 7 to 9 rupees per bullock load between Oumrawutty and Bombay, or allowing 3 bullock loads to a candy, to an average of 24 rupees per candy, a sum equal to 80 per cent. upon the first cost of the article. But this is not all. The time occupied on the route between Berar and Bombay is very great. A laden bullock travels only at the rate of 9 miles a day, and often from lameness, fatigue, and other causes, is obliged to remain stationary for days together. About 70 days, therefore, are required to effect the transit between the place of cultivation and the coast, and as the cotton of Berar ripens in February and March, it requires the utmost exertion to bring any portion of it to market previous to the setting in of the south-west monsoon; while it almost invariably happens that large quantities are caught on the road by the rain, and if not destroyed, are greatly damaged, by becoming wet, mouldy and black. Besides, in such cases, numbers of the cattle used for transportation are killed from overwork; as in addition to the anxiety felt to push them on to the utmost to avoid the effects of rain, the cotton with which they are laden, from absorbing quantities of moisture, becomes double its original weight, and actually crushes the animals it is upon to the ground. It frequently happens therefore, owing to this and the other causes I have mentioned

that hundreds of their carcasses are to be met with just previous to the monsoon strewed along the paths they have traversed.

All this however, may easily be improved. The natural and obvious remedy is a good road for wheel carriages ; at present nothing of the kind exists over the greater portion of the route between the places above mentioned.

The effects which improving the means of communication in this way would have upon the trade of central India are almost incalculable. The rude carts of the country upon ordinary and very imperfect roads, lessen the cost of transportation as compared with bullocks in the proportion of two to seven,* and admit at the same time of double the speed attainable by the latter.

Were, therefore, the trade of Berar to remain stationary instead of improving, as it might very reasonably be expected to do, by the construction of a good road to the sea-coast, the first effect of such a measure would be to lessen the cost of transportation five-sevenths upon the amount of the produce sent to and from that and the neighbouring provinces, which was last season estimated in round numbers at

	Bullock Loads.
Cotton..................	90,000
Salt....................	200,000
Total	290,000

But, instead of estimating the probable saving upon this immense traffic at five-sevenths, suppose, to be within bounds, that it is taken at only one half. The result allowing eight rupees as the average cost of transportation for a single bullock load would be a reduction of expense of sixteen lakhs of rupees per annum, or in round numbers of 160,000*l.*, and this, it is to be borne in mind, would be upon one route alone ! At the same time such a saving would probably be the least of the advantages resulting from the work in question. By lessening the expense at which the produce of central India, on the one hand,

* Colonel Briggs, the late resident at Nagpore, who has resided for many years in the valley of Berar, estimates the difference between the 2 modes of conveyance as still more considerable. He found, by enquiries made on the spot, that a common cart with two bullocks conveys seven ordinary bullock loads ; and that carts on a good road proceed at the rate of 18 miles a day. Whereas laden bullocks, as I have stated, accomplish only one half of that distance. The proportion between the two, therefore, in his opinion, is as 7 to 1, in favour of the former.

and of the coast on the other, could be carried to a market, it would increase the demand for it to a proportionate extent. This again would stimulate cultivation and production, and, as the population of the country in question is enormous, it is difficult to assign limits to the increase of trade that would arise from conferring upon it merely the ordinary means of intercourse in all civilized states, of which hitherto it has unfortunately been in a great measure deprived.

It may be as well, however, to shew the productive powers of the country more clearly, to instance the increase which has lately taken place in the amount of cotton exported from Bombay. From 1828 to 1835 the exports averaged 178,000 bales a year, and remained nearly stationary. But the high prices of the latter year led to more extensive cultivation, and, notwithstanding numerous obstacles to production, the Presidency of Bombay last year produced and exported no less than 290,000 bales of cotton, being an increase of 112,000 bales within the year. Some portion of this increase no doubt is attributable to an unusually good season, but by far the largest share arose, as the reports of the revenue collectors shew, from extension of cultivation alone. Here, then, is a specimen of what India is capable of doing under favourable circumstances, and there can be no question whatever that the production of cotton would, with good roads to the interior, go on increasing as rapidly as it increased during the last twelvemonth; for the stimulus to cultivation would be as great from decreased expenses as it has lately been from increased prices.

Thus with proper management we might reasonably expect to see the exports of the country in this staple alone, swelling at the rate of 100,000 bales per annum, and amounting probably at no distant period to a million of bales. And what would be the consequence in other respects? Besides benefitting the revenue, and improving the condition of the people of India, such a trade would give employment to a vast amount of British shipping (400,000 tons), at the same time that it created a greater demand for the manufactures of the mother country.

Upon the trade in salt, the effect of improved means of communication probably would be equally great. The first cost of this article is but trifling, amounting in general, to less than an eighth of the sum paid for its transportation to the market of Oumrawutty. Any thing, therefore, which reduced the latter, would, to almost an equal extent, affect the price of this great necessary of life, to the consumer in central India, who at present, from being forced to supply himself with it, by means of a slow and laborious land carriage of 600 miles, finds it one of the most expensive articles of food. There can be little doubt

therefore, that a reduction of fifty per cent. in its price, which, I am confident might be effected by good roads, would at least double the quantity consumed, and that instead of the trade in it being limited to 200,000 bullock loads, it would soon exceed twice that amount.

Nor is it in cotton and salt alone that an improvement of this kind would take place. Every description of raw and bulky produce, such as wool, hemp, linseed, and dye stuffs, suffers in an equal degree by the present state of things; the effect of which in many cases, may be estimated as doubling and trebling their price, between the place of cultivation and the sea coast, where a large market for them alone exists. Great, therefore, as the field unquestionably is for improvement in India in the mode of cultivating and preparing its products for market, and beneficial as the introduction of new articles of produce, suited to the wants of Europe, as well as to those of the native population, would be, I cannot but think that the simplest, surest, and most important step towards bettering the condition of the people, and increasing the resources of the country, will be facilitating the means of internal traffic. G. A.

London, May 25th, 1837.

Account of the cultivated Oil and Cordage Plants of Dekhan, by Colonel Sykes, F. R. S.*

June 16, 1837.—Kurdee, Kurtuh, Koosoom; *Carthamus persicus.* Flowers not used as a dye, sown with shaloo (*Andropogon sorghum*) in the proportions of 1 to 8, returns 53 for 1; ripe the end of March. The seeds produce an edible oil, which is esteemed when fresh; it is in use also as a lamp-oil. Forty-eight seers of seed produce seven and a half seers of oil, or more than 15 per cent. weight against bulk. The price of the seed in the Serroor market, in August 1825, was 20 seers bulk for two shillings; but this was dear. Price of the oil at the same time 3¾ seers, or about 7-lbs. avoirdupois, for two shillings; the same name of Koosomb to both species. In times of scarcity, the seeds are eaten whole as food, also the leaves as greens. The oil-cake is highly nourishing to milch cattle. Price, 80 seers, or about 160-lbs. avoirdupois, per two shillings.

This article is not in any Commercial Price Current.

Juwus, Atahsí, Teesee; *Linum usitatissimum.* Flax, cultivated only for its oil, used in lamps. The return about 20 for 1. In a stone-mill, 4 seers measure of seed produce one of oil. Price of the seed in Poona,

* Colonel Sykes' mode of spelling Oriental words is adhered to in this paper.—Ed.

January 1825, sixteen seers for two shillings; this was dear. Oil used medicinally. Oil-cake given to cattle. The seed itself eaten by man, in condiments, made up of the Kuree Neemb (*Bergera Kœnigii*), capsicums, &c.

This article is not in a late Bombay Price Current.

Moharee, Rajeeka, Raee; *Sinapis racemosà.* Two other kinds of mustard seed are also cultivated; Raee Pandree, or white mustard, and Manjurya, black mustard-seed. As a field produce, these kinds are cultivated for their edible oil, used also medicinally for rheumatism; but almost every part of the plant is used either as greens or condiment. Price of moharee at Serroor, in August 1825, 8 seers, or 16-lbs., for two shillings; the other kinds about 25 per cent. cheaper.

This article is not in a late Bombay Price Current.

Yerund-tambra, Wahyagrah-dallah, Erand; *Ricinus communis.* Common red castor-oil, a perennial plant of 20 feet high, but is cut down yearly. The seeds are used to produce a lamp rather than a medicinal oil. I found 4 seers measure to produce 1 seer, or 2-lbs. weight of oil, or 25 per cent. The leaves are in universal use for poultices for Naroo or Guinea worm, inflammation of the eyes, severe head-ache, bruises, &c. The flowers are given to women four months gone with child, and the leaves are used as a febrifuge.

Several species of *Ricinus* are cultivated in Dekhan.

In a Bombay Price Current of the 28th January, 1837, castor-oil is stated at 4 rupees the maund of 28-lbs., or 3½-lbs. for a shilling.

Teel, Teelhah, Til; *Sesamum orientale,* or *indicum.* There are two varieties, the white seeded, and that with blackish red-seeds. Although not a bread grain, Teel is used for many economical purposes. The seed is too oily to be made into flour, but it is toasted and sprinkled on bajree (*panicum spicatum*) bread, indeed, upon any kind of bread. It is used in many compound dishes; various sweetmeats are made with it, but it is principally esteemed for its valuable and agreeable oil. Three seers bulk of the seed produce one seer weight of oil, or 33⅓ per cent. This oil is preferred in cooking to all others. I say nothing of the extensive use of the seed and oil in religious ceremonies. The oil-cake is eaten by the farmers with salt and pepper. Price in the Poona market, in January 1835, 5 seers per rupee. In October of the same year I counted 103 capsules on one plant, averaging 68 seeds each, giving a return of 7208 for one.

This valuable seed is not in a late Bombay Price Current.

Karleh, Kalee-Teel. *Verbesina sativa.* From its being frequently called Kaleh-Teel (black sesamum), it is confounded by Europeans, not

botanists, with the sesamum, but it is an entirely different plant. Its seed produces an edible oil, which is the great substitute for Ghee (clarified butter), with the poorer classes of the cultivators and the population generally; 12 seers of seed in bulk in a stone mill produce 3 seers, or 6-lbs., of oil in weight, or 25 per cent. Price at Neelsee in April 1825, 20 seers measure for two shillings. The oil-cake is in high esteem for milch-cows; price at Poona in January 1825, 60 seers, or 120-lbs., for two shillings. Feverish and asthmatic persons, and those whose digestions is not strong, cannot eat the karleh oil with impunity. As an edible grain, karleh is only used in acid and pungent condiments.

Unnoticed in Price Currents.

Mohha, Maddooddoomah, Mohha; *Bassia latifolia*. A handsome forest-tree. The well-known ardent spirit called mowra, is obtained from the inflated fleshy tubes of the corolla. The dried flowers are an article of trade; they have a slight resemblance to the dried seedless grape, and are not disagreeable in flavour. The seeds of the fruit produce a thick edible oil. The bark of the tree is used in obtaining a brown colour. Wood of the tree durable, and compact.

The article is unknown in Price Currents.

Char, Peeyalah, Peeyal; *Chironjia sapida*. A forest tree. The seeds of the fruit are much esteemed for their fine flavour. A medicinal oil is extracted from them which is considered efficacious in bile and phlegm. Price of the kernels or seeds at Poona, in January and February 1825, 4 pounds, avoirdupois, for two shillings.

Unnoticed in Price Currents.

Cordage Plants.

Ambaree; *Hibiscus cannabinus*. This plant produces an oil-seed; but it is principally cultivated for its bark for cordage. The plant sometimes attains the height of 12 feet; usually 5 or 6. Bark separated by steeping. The bark is called waak. Price at Poona, March, 1825, best kind 10-lbs. for two shillings, and second kind 12-lbs. The oil from the seed is scarcely deemed edible; in pressing it, therefore, the seed is frequently mixed with the seeds of the verbesina and linum. Price of Ambaree seed at Ambagaon, February 1826, 120-lbs. for 2 shillings. Price of the bark or waak, 16-lbs. for two shillings. The length of the fibre is of course proportioned to the growth of the plant. Both cordage and twine made from it are very strong. At present, very little more is cultivated than is required by the farmer himself, for his own use.

Unnoticed in Price Currents.

Taag, Shunum, Sun; *Crotolaria juncea*. Bengal Hemp. The stalks are wand-like and 5 or 6 feet long. One hundred bun-

dles, each bundle containing from 400 to 450 stalks, produces from 12 to 16-lbs. of fibre, which, in January and February 1826, sold at the rate of 12-lbs. for two shillings. During the rains, the farmer and his family make their own twine, which they weave into pieces of very coarse canvass, called gohnpaat, from thirty to forty feet long, and ten inches wide. These are made into canvass bags, called gohnees, for the conveyance of grain on the backs of bullocks; into coverings for the saddles of camels; into large sheets, in which the baggage is tied up on the backs of elephants and camels; into pack-saddles, &c. &c. All the writing paper in common use in Dekhan, is manufactured from old and worn-out grain-bags, and other articles made from the fibres of Taag.

In a Bombay Price Current, of January 28, 1837, Gujerat hemp is stated at 68 rupees the candy of 784-lbs. or 5¾-lbs. for a shilling.

Cocoa-nut oil being now imported into England, in considerable quantities, I shall only express my opinion, that its present retail price, of 4s. 6d. per gallon, weighing 9-lbs., must give an enormous profit, as the cost-price, at Bombay, on the 28th of January, 1837, was 1s. 9d. for 18-lbs. avoirdupois; and in Ceylon it is much less. In fact, the present charge upon the cost-price, is 312 per cent. I must express my regret also, that it is not more generally used in England; for, instead of the detestable smell of fish-oil, it has rather an agreeable odour; and it is readily consumed in open glass vessels, with floating, or standing wicks, whatever the temperature of the air may be.

At a future period, I shall be happy, if it be desirable, to give an account of the plants producing aromatic seeds, which are generally cultivated in Dekhan, and the seeds are very cheap. Also an account of the plants used in dyeing, tanning, wild cordage and oil plants, &c.

I have purposely excluded from the above accounts all systematic details respecting the cultivation, time of flowering, returns, &c., of the various plants; believing that such details could not be of any interest to the merchant or manufacturer in Great Britain. If it were desirable, I could furnish the medicinal properties of the plants, according to the Hindoos.

The first name of each plant is in the Mahratta language, the second name in Sanscrit, the third in Hindostanee, and the fourth is the botanical name.

The standard measure of capacity in the Dekhan is called an adholee, of 2 seers. Of small grained rice it contains 4-lbs. 12 oz. 7 dwts. 22½ grains, avoirdupois weight. It contains a weight of water, at a temperature of 75° Fahr., of 5-lbs. 3 oz. 3 dwts. 5½ grains, or 144.4

cubic inches; and at a temperature of 60° Fahr., it contains 48 per cent. less than an imperial gallon, or very nearly two quarts. Rigidly the seer of capacity is 4.17 per cent. larger than an imperial quart. Measures of capacity and weights, however, differ a good deal in different market-towns. The standard seer of weight is equal to 80 Arkoosee rupees, or 1-lb. 15 oz. 8 dwts. 18¾ grains, avoirdupois; but the seer commonly in use weighs only 76 rupees.

Geological Society of London.

February 22, 1836.—A paper on the Geology of Cutch, by Captain Grant, of the Bombay Engineers, and communicated by Charles Lyell, Esq., F. G. S., was read.

This district, so highly interesting on account of the phænomena which accompanied the earthquake that devastated it in 1819*, is situated near the eastern branch of the Indus, between 22 and 24 degrees of north latitude, and 68 and 72 degrees of east longitude. On the north, it is bounded by the Grand Runn, and the Thur or Little Desert, on the south by the Gulf of Cutch and the Indian Ocean, on the east by the province of Guzerat, and on the west by the eastern branch of the Indus and the territory of Sinde. Its superficial contents are about 6500 square miles. The surface is traversed by three ranges of hills, having in general an east and west direction. The hills constituting the northern chain, which borders the Runn, present a perpendicular capping of sandstone, surmounting towards the north a sloping talus, and towards the south an inclined plane, both composed of laminated clay and slaty limestone, with occasionally layers of sandstone. The second or central range, is constituted partly of the formation last mentioned, and partly of another consisting of sandstone and shale. The third or southern, is formed wholly of volcanic rocks, but has nearly the same linear direction as the others.

To the south of the last range is an extensive flat, composed of a deposit, considered by Capt. Grant to be tertiary, and of an alluvial band, bordering the sea coast.

The first of these formations, which constitutes the northern range of hills, abounds with Ammonites, Nautili, Belemnites, Trigoniæ, and other fossils characteristic of the oolitic system of England. The formation of sandstone and shale, which occupies a much greater surface,

* A collection of papers relative to this earthquake appeared in Phil. Mag. First Series vol. lxiii. p. 105 *et seq.*

contains, in various localities, thin beds of coal, sometimes very impure, but at others tolerably good; also layers of iron ore; and in the shale as well as in the sandstone, casts of reeds and impressions of ferns are stated to occur. With respect to the relative age of these two formations, Capt. Grant was unable to procure any decisive information; but he thinks that the sandstone and shale system passes beneath that of laminated clay and limestone.

The iron ore is smelted by the natives to some extent, particularly near the town of Doodye. The variety generally selected, on account of the imperfect apparatus employed, has a spongiform texture, small specific gravity, and is easily frangible. The ore is broken into small pieces and disposed in layers, alternately with others of charcoal, in a rude open furnace, acted upon by two small bellows made of sheep skin. The metal on being fused, falls into a small hole at the bottom of the furnace, whence it is removed into an inclosed furnace, and subjected to the same blasts until it acquires a white heat, when it is taken out and beaten into a bar. A considerable quantity of iron was formerly made from another variety of ore, found in the superficial soil at the north-western extremity of Cutch.

In one part of the province, the author noticed a deposit of variegated sandstone and marl, but was unable to determine its position with respect to the other formations. It is covered, in part, by an aluminous earth, on which rests a bed of red clay. The former, when visited by Capt. Grant, had been burning spontaneously for a long time, sending forth a suffocating sulphureous smoke. Considerable quantities of alum are made from the earth and exported to Bombay.

Another formation, described by the author, occurs south of Luckput, near the eastern branch of the Indus. It consists of soft and hard, whitish limestone, containing innumerable Nummulites and Fasciolites, also Echini, Spatangi, Ostrea and Corals.

The tertiary deposit consists of a hard, argillaceous grit covered by a conglomerate. The organic remains, which are very numerous, are often disposed in beds confined to one species; the prevailing genera being Arca, Pecten, Ostrea, Cardium, Conus, Cypræa, Ovula, Fusus, Trochus, Solarium, Strombus, and Cassis. Patches of Corals, two or three acres in extent, sometimes also occur.

Under the head of alluvial tracts, Capt. Grant gave an account of changes, produced along the southern coast by the deposition of sediment. At Mandavee is a ruin, at a spot called the old Bunder or quay, now about three miles inland; and in the centre of the town is a small temple, built upon a rocky foundation, but said to have stood in the sea when the old Bunder was the landing place.

At other localities in the gulf of Cutch, similar processes are going on, rendering it necessary to remove the landing-places frequently further seaward. The rapid progress of these accumulations is ascribed to the sea, during nine months washing back the sandy detritus, brought down by the periodical floods. The same operation is also in progress at places separated from the main waters of the gulf by small creeks or inlets, some of which penetrate six or seven miles from the coast, through a tract covered with shrubs. At low-water the whole of these plants are exposed down to their roots, but at high-tide merely their tops are visible, so that boats sail through a completely marine forest. The growth of these shrubs is rapid, and the sailors have constantly to force the boats through the upper branches, particularly at the angles of the creeks, when they wish to save a tack. The stems and lower branches are covered with testacea, whilst the upper are occupied by numerous water-fowl. The land gains in this district, by the deposition of the muddy contents of the small streams during the monsoon, when the water passing very slowly between the stems of the shrubs, a great portion of the matter held in suspension, is precipitated. This alluvial district occurs only on the southern coast of the Province. In August, 1834, the rains were very violent and continuous, and the river which flows past Nurra, on the borders of the Grand Runn, covered with a fine soil a surface of nearly 1000 acres. On the opposite or southern side of Cutch, not far from Mandavee, 300 acres were washed away; and not far from the same spot, half a small village was removed bodily into the sea.

Volcanic Rocks.—Besides the southern range of hills already stated to be entirely composed of trap or volcanic rocks, other extensive districts of the same nature occur between the northern and central ranges, and to the south of Luckput; besides innumerable minor outbursts, some of which forming small conical hills, are arranged around a central area. The author noticed no recent crater, unless the hill, called Denudar, be considered as such, and down the flanks of which he traced a lava stream. The volcanic rocks consist of several varieties of basalt, often columnar, amygdaloid, greenstone, and trachyte. Capt. Grant described these rocks in great detail, as well as the effects evidently produced by them, enumerating a great variety of instances, in which the disturbance of the strata can be traced, in the clearest manner, to the protrusion of trap. In some cases the volcanic mounds are themselves cracked or fissured from top to bottom.

That the igneous eruptions occurred at many distinct periods, Capt. Grant showed by sections, in which beds of trap alternate with others of crystalline limestone, calcarious tuff, and a calcarious grit, which sometimes contains angular fragments of basalt; and by beds of very different characters reposing on each other.

Among the phænomena connected apparently with volcanic action, the author described a number of mounds, varying in diameter from 3 to 20 yards, and covered with small tabular plates of sandstone, the lines of fracture radiating, though irregularly, from a centre. In some instances the summits of these little mounds having been removed, a regular circle of stones appeared, inclosing an area of sandstone, the fracture of the stones decidedly radiating as the stones of an arch. In other instances they resembled small hillocks, from the upper part of which the outer coating or tabular plates had generally fallen away, and the whole consisted of a heap of broken masses of rock.

The author then described what he considers to be a very recent volcanic outburst. It is situated in the nummulitic limestone, near the village of Wagé-ké-pudda, and forms a rather high flat basin, or table land of about two square miles, composed of calcarious marl, and flanked by low irregular hills of ironstone and gravel. The sides are broken by fissures, ravines, and hollows, and the bed of the basin is covered with hillocks of loose volcanic scoriæ of various colours. Within the basin are also several small craters or circular spaces, surrounded imperfectly by walls of columnar, globular, or friable basalt. These basaltic walls, however, he conceives, are of anterior date to the mounds of scoriæ, which he is of opinion cannot be of great antiquity, on account of the facility with which their loose materials are removed by atmospheric agents. Other similar outbursts were also described.

The paper concluded with an account of the Great Runn, a district (exclusive of the elevated tracts called " the Bunnee and Islands") of 7000 square miles. This singular region, as already described by Capt. Burns, consists of a sandy flat, dry for the greater part of the year, but during the prevalence of the south-west winds, converted into an inland sea, passable however on camels. Capt. Grant believes that its present oscillating position between land and water, is due to an elevation of the Runn, and not to a change in the level of the sea; and in support of his opinion adduced the alterations both of elevation and depression of land, by the earthquake of 1819. He described also several extraordinary walls of rock, thrown up apparently by volcanic

action, sometimes assuming a dome shape, at others segments of circles or straight lines.—*London and Edinburgh Philosophical Magazine, and Journal of Science, No.* 65.

Zoological Society of London.

November 22, 1836.—Mr. Gray exhibited a specimen of *Argonaut* with an *Ocythoë* from the Cape of Good Hope, and stated that as the subject had been brought forward at the last meeting, he was induced to remark that every time he considered it, and compared it under its various bearings with the relations of other *Molluscans* and their shells, he was more and more inclined to believe that the animal found in the shell of *Argonauta* was a parasite. He gave the following reasons for this belief.

" 1. The animal has none of those peculiarities of organization for the deposition, formation, and growth of the shell, nor even the muscles for attaching it to the shell, which are found in all other shell-bearing *Molluscans ;* instead of which it agrees in form, colour, and structure with the naked *Mollusca*, especially the naked *Cephalopods.*

" 2. The shell, although it agrees in every respect with the shells of other *Molluscans* in structure, formation, and growth, is evidently not moulded on the body of the animal usually found in it, as other shells are ; but exactly agrees in every point (except in the form of the spire), with the shell of *Carinaria,* which coincided with the other *Molluscans* in all these respects.

" 3. The body of the animal does not appear to have the power of secreting calcarious matter, for it does not, like all the *Mollusca* which have that power, secrete either a solid deposit or distinct *septa* to adapt the cavity of the shell to the increase of the body, nor does it cover over with calcarious matter any sand or other extraneous bodies which may have accidentally intruded themselves between the mantle and the shell, but leaves the sand, which is often found mixed with the eggs, free, without taking any means to prevent it from irritating the skin.

" 4. The young shell of the just hatched animal which forms the *apex* of the shell at all periods of its growth, is much larger (ten times) than the eggs contained in the upper part of the cavity of the *Argonaut.*"

Mr. Gray further stated, that he does not think that any inference can be drawn in favour of the opinion that the *Ocythoë* forms the shell, from either of the three arguments which have been produced in favour of that hypothesis, which he then examined in detail.

"5. He believes that Poli must have been misled when he thought that he had discovered the animal in the egg of an *Ocythoë* covered with the 'rudiment of a shell,' because all the *Molluscans* which he has seen in the egg (*Cephalopods* as well as others) were covered with a well-developed shell, even before all the organs were developed, and the figure which Poli gives of the rudiment does not agree with the nucleus found on the *apex* of the shell of the *Argonauts*. Unfortunately, none of the eggs of the *Ocythoës* that have been examined by other observers have been enough developed to show the fœtal animal.

"6. The different species of *Argonauta* are said to be inhabited by different species of *Ocythoë;* but allowing this to be the case, it only proves that each of these genera have local species: the same may be observed with respect to the *Hermit Crabs*, without proving anything in favour of their being the framers of the shell they live in.

"7. That though some specimens of *Ocythoë* preserved in their shells are marked with cross grooves resembling the grooves on the shell, yet these grooves are only formed by the pressure of the dead animal against the shell; for the specimens of the animal which are found out of the shell, or which are taken out of the shell while recent, are always destitute of these grooves, or of the compressed form of the cavity of the shell. That some specimens which he had received from the Cape, which had been packed on their sides, had the upper side of the animal smooth and rounded, and the lower flat, and curved like the shell on which it was pressed by its own weight; while a specimen which he had received from the Mediterranean packed erect, with the mouth upwards, so that the animal was equally pressed against each side of the shell, was flattened and curved on each side, like the specimen examined by M. Ferussac."

Mr. Gray also stated that, so far from the animal using the finned arms as sails, they were the means by which it retained itself in the shell; and he further observed, that it was very difficult to distinguish the species of *Argonauta*, as they varied greatly in shape, and that on a comparison of many specimens, he had found that the presence or absence of the spines or ears at the back of the mouth were of no importance as a specific character, specimens of each of the recorded species having this process developed only on one or the other side.—*London and Edinburgh Phil. Mag., and Journal of Science, No.* 65—*July* 1837.

XVI.—Scientific Intelligence.

The Madras Medical School.

The erection of an edifice at Madras especially devoted to the cultivation of the different branches of the science of Medicine, and the instruction of the Natives of India in that most useful and highly important department of knowledge, is too grand and interesting an event to permit of its being unnoticed by the local scientific Journal. We cannot but consider the introduction of a systematic plan of education in Medicine as the most important step that has yet been accomplished towards the mental improvement of the people of this part of India. We have all heard that the Natives generally are averse from the employment of European remedies and plans of treatment; their brethren, who will now receive excellent instruction, will be widely spread over the country, warm advocates, it may be supposed, for the adoption of our superior modes, and desirous of rescuing their countrymen from the ignorance and empiricism of their own practitioners. Another point gained is that all prejudices regarding dissection are done away with among those who come as students, and a foundation is thus laid for the acquirement and diffusion of a knowledge of Anatomy, a science, which, at present, is absolutely unknown among the Natives of India, and without which, we need not say, an attempt to practise Medicine and Surgery is the impudent pretension of a charlatan. The alumni of the New Medical School, their course of study over, will be scattered in every direction, and the influence of their knowledge must produce some re-action on the minds of their countrymen; and though the effect at first may be trifling, yet a momentum will be given to the onward march of improvement in the course of time, and a favourable effect on the intellect and character of the people of India must be the result. An incidental advantage is gained, too, by the circumstance of all instruction being imparted in the English language; so that ripe scholars in that tongue will be formed, and thus they may be weaned from the study of their own authors, from whom little but error and superstition is to be gained. These are the probable and distant advantages to be derived; but, in the mean time, Government and the public enjoy the positive and immediate benefit of having a well-trained and well-instructed set of subordinates in the medical department of the public service.

It may be as well to advert briefly to the history of the rise and progress of the Medical School, and to explain its nature and objects, because many of our distant readers may not fully comprehend these points, and those in Europe, unconnected with India, may be at a loss to understand to what kind of establishment we allude. For the information of the latter, then, we may premise, that there are two classes of subordinate officials attached to the Medical Service of India: namely,—*Apothecaries*, divided into two grades, who are warrant officers; these are Europeans by birth, or descendants of Europeans, nearly the whole being of the class denominated Indo Britons by our Government, but generally adopting the appellation of East-Indians themselves:—and *Dressers*, also divided into two grades, chosen entirely from the Natives, who, in the service, rank with private soldiers. In former days, these received no preparatory education but generally attended the regimental and other hospitals, as volunteers, to acquire information. In 1835, Government determined that there should be a school for the instruction of candidates for the service at the General Hospital of Madras, and the medical officers of that establishment, Dr. MORTIMER and Mr. HARDING, were appointed Superintendents, or Professors. Very great credit is due to those gentlemen for the persevering industry with which they have advanced the school from its first small beginnings to the palmy state in which it now flourishes. At first the pupils were instructed in narrow limits within the house assigned as the residence of the medical officers. The fruits of the instruction communicated in that insufficient and unworthy place were soon so palpable and so important, that the Government determined on the erection of a fitting structure for the purpose; and the building adjoining the Hospital, the first public examination in which we propose to give some account of, has within the last few months been completed. It is but justice to the late Governor of Madras, Sir FREDERICK ADAM, to say, that the establishment of a school of instruction in Medicine was a favourite object with him, and that to his energy and determination in the matter is mainly attributable the successful consummation which we now see. The hands of the rulers of the minor Presidencies are restrained from doing good, by the financial restrictions imposed on them: however, with economy and some management, the expenditure was kept within the prescribed limits, and our Medical School now rears its dome on high. At present the pupils entirely consist of individuals of the before mentioned description. As essential to their admission a good acquaintance with the English lan-

guage is exacted, together with elementary medical knowledge, which they acquire as candidates in the hospitals throughout the country. A limitation of the beneficial influences of the institution to the public servants, we presume is not intended to be enforced by Government: and we doubt not that the fullest advantages of such an establishment will be reaped shortly, by the admission of pupils, the children of those who are desirous of educating their sons to a knowledge of medicine, with a view to their exercising the profession in this country, with the lights of European science, instead of by the scintillations of their own *ignis-fatuus* which leads to a region where *nox incubat atra.* The only pupil received, not belonging to the public service, is an Indo-Briton sent for instruction by the Rajah of Travancore.

On the 13th of December last the first public examination of the pupils of the Medical School in the new building took place. Lord ELPHINSTONE, Sir PEREGRINE MAITLAND, the Hon. Mr. SULLIVAN, the MEMBERS of the MEDICAL BOARD, and a great many Gentlemen, professional and others, were present. His Lordship the GOVERNOR, and the rest of the visitors, were received in the room assigned to the reception of the library, when the books for the School shall arrive. His Lordship was then taken over the building, and inspected the Laboratory room, at that time not fitted up, and the Museum. The latter room already contains a great number of very beautiful anatomical and pathological preparations, admirably and skilfully put up by Mr. HARDING. The theatre is a very elegant apartment, built nearly after the model of such rooms in Europe, and in all respects suited to both teachers and pupils. A class of 93 students were assembled on the ascending benches: of whom 25 were the remaining half of a former class, the others having been dismissed, and appointed to the Service; these had been engaged in their studies between 8 and 9 months. The junior class of 68 had only been at the Institution about 7 weeks, and consequently had only advanced to the first division of the course of instruction, the study of *Materia Medica.* These circumstances were explained to the auditory in a brief introductory address by Dr. MORTIMER, who, among other subjects, stated that the great obstacle to the advancement of the pupils was their deficiency in preliminary education, which is necessary to enlarge the mind, and prepare it for the reception of truths, which, to the untutored intellect, are abstruse and difficult of comprehension, although they may be the mere elements of knowledge,

which, among those who are more advanced in education and civilization, are received and understood almost intuitively, and thus exist as first principles already planted in the mind. The students were more than half Indo-Britons, with two or three who appeared to be Europeans; the remainder were Natives, consisting of Gentoos, Tamulians, one Mussulman, and six Christians.

Dr. MORTIMER opened the examination with the subject of *Materia Medica*, and Mr. HARDING followed on *Anatomy*, in which, and on the physiological uses of the parts, Dr. MORTIMER participated. The promptitude, clearness and precision with which replies were given, could hardly be exceeded, and there appeared to be an aptitude for instruction, and an emulous desire of acquitting themselves well, manifested by all, European, Indo-Briton, and Native, which forms the best augury of success that could possibly be afforded. An articulated skeleton, and some preparations from the subject, were employed, during the examination, and one of the celebrated anatomical figures of *Auzoux*, imported from France for the school, was also displayed and taken to pieces.

The following syllabus of the examination will afford information of the extent to which the attainments of the students reached at that period.

MATERIA MEDICA.

Definition, Classification, &c.
The several classes defined as arranged according to their effects.
Articles belonging to each.
Articles belonging to more than one class.
The preparation of Chlorine—diagrams showing the two common modes.
Acids—Alkalies—Salts, &c.—Definition and properties generally.

MEDICINAL COMBINATION.

The uses and advantages &c. of combination of several preparations of the same substance.
Do. of combination of several articles of the same class.
Conditions of the system unfavourable to the actions of particular remedies, especially of mercury, and how obviated.
Means of remedying prejudicial effects produced by particular medicines.
New articles produced by, and remarkable change of effect resulting from chemical combination.

ANATOMY.

Bones generally, with principal joints.
Diseases of the bones,
Brain and its circulation.
Origin and passage of the nerves of the senses.
Thorax—its contents.
The structure of the Heart and great vessels.
The circulation in the fœtus and adult, and changes of the blood in the lungs.
The boundaries and membranes of the abdominal cavity.
The bowels generally.
The liver and secretion of bile.
Digestion.
Kidneys—and urinary secretion.

The Right Honourable the GOVERNOR expressed himself highly gratified with the result of the examination, and addressed a few words of exhortation and encouragement to the students to urge them to assiduity in their useful and honourable pursuits.

In our next number we propose to give a description of the building with a lithographed plan and elevation.

Dr. Wight's Illustrations of Indian Botany.

We have seen the first number of this work in the printer's hands, not yet stitched together, and hasten to announce the fact to the numerous subscribers, assuring them, at the same time, that, in our opinion, the most sanguine expectations regarding the mode of its execution will be amply fulfilled. To the botanist and to the amateur student who is desirous of obtaining a knowledge of the vegetable productions of India, they are every thing that can possibly be desired, and the most fastidious lover of the fine arts will be gratified with the lithographs, and astonished that such works should have been produced in this country. Our own feelings on the subject are those of unmixed gratification and wonder. It must be recollected, however, that these are the first specimens from unpractised hands, and that (truly excellent as they are) they are susceptible of improvement, and will attain a still higher degree of perfection, when those employed shall have been rendered more expert by the experience acquired in the progress of the work. It is cheering and gratifying to observe the zeal and energy with which the talented and spirited author overcomes obstacles which to ordinary minds would be insurmountable. He has constructed a lithographic press at Madras, and the whole process is conducted on his own premises, and he has only bought experience by numerous difficulties and failures, which have served to freshen his ardour, instead of frustrating the project altogether.

From the terms of the publication in the Prospectus, (see our last Number) it will be readily known that no pecuniary profit is looked for by the author. The already crowded subscription list will go a good way to defray his expences, and we trust and believe that he will not be permitted to suffer loss. The impression of the work will consist of a limited number of copies, only, so that it is particularly desirable that the number of subscribers should be speedily ascertained, as not many surplus will be struck off.

Lieutenant Newbold on the Straits of Malacca.

Lieutenant Newbold, whose residence in the Straits, and abilities for the task, render him a competent authority, purposes to publish a

Political and Statistical Account of our Settlements there, as will be seen by an advertisement on the cover. The manuscript is already sent to England, we believe, to be put into the publisher's hands; and the following is a table of the contents of the work.

CHAP. I.—*General view of the British Settlements in the Straits.*—Comprising their Relative Geographical position—History—Government—Political and Commercial Relations—Sketch of the Commerce—Currency—Weights and Measures—Administration of Justice—Expences of the Queen's Court of Judicature—Population—Chinese Settlers—Suggestions and Remarks on European and American Colonization—Price of labour—Seasons and Winds—Military Establishment and its Expence to the State—Piracy; its causes, hints on suppression of—Noted piratical haunts—Revenue and Expenditure of the three Settlements and total annual cost to Government.

CHAP. II.—*Pinang.*—Geographical position—Physical aspect—George-Town—Geology—Government—Population—Revenue—Trade—Cultivation of Spices—Produce—Leases of Land—Abstract of Exports and Imports—Education among the Natives—Propaganda Mission College—Military Strength.

CHAP. III.—*Province Wellesley.*—Area—Boundaries—Physical Aspect—Climate—Produce—Concluding Remarks.

CHAP. IV.—*Malacca.*—Geographical position—Area—Town of Malacca—Boundaries—Physical Aspect and Geology—Climate—Produce—History—Government—Population—Slaves and Slave Debtors—Revenue—Tenth on Land-produce—Trade—Education among the Natives—Anglo-Chinese College—Concluding Observations.

CHAP. V.—*Naning.*—Area and Boundaries—Physical Aspect—Streams—Roads—Thermal Springs—Military character of Inhabitants—Unhealthy localities—Principal places—Religion—Priests—Mosques—Sacred Tombs—Ceremonies observed on the occasion of Births, Marriages, and Deaths—Religious Fasts and Festivals—Native system of Government—History—Population—Revenue—Mode of levying the Tenth—Trade—Gold and Tin Mines.

CHAP. VI.—*Singapore.*—Geographical position—Physical Aspect and Geology—Productions—Town of Singapore—Education among the Natives—Climate—History—Population—Military Strength—Revenue—Trade—Exchange—Tonnage—Outline of the Trade of Singapore with China, the Indian Presidencies, Great Britain, Java, the Malayan Peninsula, Siam, Cochin China, Cambodia, Islands of the Archipelago, Continental Europe, Mauritius, New South Wales, the Cape of Good Hope, America, Sumatra, Malacca, Pinang, and the neighbouring Dutch Port of Rhio, of which a brief notice is given—Concluding Remarks.

CHAP. VII.—*General View of the Malayan Peninsula.*—Comprising Geographical position—Physical Aspect and Geology—Area—Population—Exports and Imports—Tin—Gold—Iron—Zoology—Vegetable Kingdom.

The remaining Chapters will be devoted to a detailed account of each Malayan State on the Peninsula, describing their respective Boundaries, Products, History, Government, estimated Population and Revenue, and Political relations with the British Government—agreeably to the following order.

Exterior States. West Coast.	Exterior States. East Coast.	Interior States.	Interior States.
Quedah	Johore	Sungie-ujong	Calang
Perak	Pahang	Rumbowe	Jellabu
Salangore	Kemamang	Johole	Ula Pahang
Johore	Tringanu	Jompole	Jellye
	Kalantan	Srimenanti	Segamet or Muar.
	Patani		

The Appendix will contain Copies of the Treaties with Holland and Siam, and of those concluded with the Native Powers on the Malayan Peninsula.

Captain Harris on the Animals of S. Africa.

It will be observed by an advertisement on the cover, that Captain Harris of the Bombay Engineers, intends to publish a work on the Animals of S. Africa. At Bombay, where the specimens and drawings have been exhibited, the following favourable notice has appeared in the newspapers.

" Captain Harris, appears to have established a high reputation among sportsmen by his indefatigable zeal and the unerring correctness of his workmanship, but we do not consider that these qualities, however alluring they may prove to a particular class, are by any means the sole attractions to his museum, now exhibiting in Bombay, or to the works which he proposes to publish. To natural historians his researches will prove most valuable, and he may pride himself on being enrolled in the number of those who have added to the scientific knowledge of his fellow countrymen, by having discovered, in the country which he has traversed, and delineated a species of antelope, hitherto unknown and undescribed."

Mr. Hodgson's Zoology of Nipal.

The subscribers to *Illustrations of the Zoology of Nipal*, by B. H. Hodgson, Esq. British Resident in that kingdom, will be glad to learn the following particulars, extracted from the proceedings of the Asiatic Society of Bengal.

" Mr. B. H. Hodgson communicated to the Society copies of correspondence regarding the publication of his work on the Zoology of *Nipal*, and of the arrangements he had effected, requesting that the Society would add such suggestions as to them might appear desirable.

" Resolved, that the Society forward the papers (as requested) to Sir A. Johnston, stating their concurrence in Mr. Hodgson's views as to the mode and scale of publication, and urging such support for the work as the home Society should be able to afford among its members as well as through its influence with the Honourable Court.

" Mr. Hodgson has obtained the valuable aid of Sir Wm. Jardine to superintend the publication of the plates, which it is proposed to execute in lithography on an economical scale, so as to make the work a text-book for Indian naturalists rather than a costly ornament to the drawing room of the rich as intended by Mr. Gould, who estimated the expence of such an edition at a lakh of rupees! The descriptive portion Mr. Hodgson judiciously defers publishing until his return to Europe, and it will be presented in a convenient octavo form separate from the plates."

Notes.

The prospectus and specimen of the *English and Hindustani Dictionary*, by a Member of the Madras Civil Service, have been unavoidably postponed.

The *Appendix* spoken of at page 75 of this Number, will be introduced in our next, our limits having been considerably exceeded in the present issue.—Editor.

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY FOR THE MONTH OF OCTOBER 1837.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Thermometer at 10 A. M.	Thermometer at 4 P. M.	Thermometer at 10 P. M.	Rain. Sun rise.	Rain. Sun set.	Evaporation.	Direction of Wind. 10 A. M.	Direction of Wind. 4 P. M.	Direction of Wind. 10 P. M.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.
1837	Inch.	Inch.	Inch.	o	o	o	In.	In.	In.						
Oct. 1	29,958	—	29,934	82,5	—	82,0	... ...	0,058	... ...	S E		S W	Cloudy		Cloudy.
2	,944	29,852	,872	82,3	82,2	82,0	... ...	... ...	... ...	S W	S S E	S W	Cloudy	Driz.	Cloudy th. lightning.
3	,876	,808	,772	80,4	82,0	80,6	... ...	... ...	... ...	S W	N N E	S W	Cloudy	Cloudy	Do. do. do.
4	,780	,650	,728	79,4	82,0	81,9	0,217	0.100	1,769	S W W	S W	W	Driz.	Cloudy	Do. do. do.
5	,758	,678	,766	82,5	86,4	81,9	... ...	... ...	... ...	W	W	S	Th.haze	Fl. cl.	Fl. cl. do. do.
6	,866	,760	—	85,3	88,0	—	... ...	... ...	... ...	W	S S E		Clear	Cloudy	—— lightning.
7	,912	—	29,920	86,6	—	85,6	... ...	... ...	... ...	W		S	Clear		Cloudy do.
8	,906	29,860	,918	87,9	89,7	86,4	... ...	... ...	... ...	N W	N E	W	Clear	Clear	Fl. cl. do.
9	,900	,868	,910	88,0	91,0	85,2	... ...	... ...	... ...	W	E	S E	Clear	Clear	Cloudy do.
10	,938	,864	,940	87,8	89,7	84,6	... ...	... ...	... ...	W	S S E	S	Clear	Clear	Clear do.
11	,998	,940	30,006	87,3	86,4	83,6	... ...	... ...	3,298	S S W	S W	S E	Fl. cl.	Cloudy	Cloudy do.
12	30,050	,956	,030	87,3	88,5	84,1	... ...	... ...	... ...	S	S E	S	Clear	Clear	Clear do.
13	,078	30,012	—	86,5	88,0	—	... ...	... ...	... ...	S E	S S E		Clear	Clear	—— do.
14	,106	,032	30,090	84,7	87,5	84,3	... ...	... ...	... ...	N E	E S E	S E	Fl. cl.	Clear	Cloudy do.
15	,080		,050	84,0	—	82,7	... ...	... ...	... ...	N		E N E	Cloudy		Fl. cl. th. lightning.
16	,056	29,980	,010	82,3	86,0	82,3	0,577	... ...	... ...	N E	N E	N E	Fl. cl.	Clear	Clear, lightning.
17	,042	,954	29,990	84,3	85,0	81,9	... ...	... ...	... ...	N E	N E	N E	Fl. cl.	Th.haze	Haze do.
18	,108	30,036	30,096	84,4	85,0	82,6	... ...	... ...	2,878	N E	N E	N E	Th.haze	Th.haze	Clear do.
19	,112	,050	,100	82,6	84,0	83,3	... ...	... ...	... ...	NbyNW	N E		Cloudy	Cl. driz.	Cloudy do.
20	,102	29,956	29,984	80,0	75,7	80,0	... ...	0,917	... ...	N W	N W		Cloudy	Rain	Cloudy do.
21	,002	,924	,970	79,9	82,8	81,0	... ...	... ...	... ...	S W	S S E		Cloudy	Th.haze	Cloudy do.
22	29,946	—	,887	82,4	—	80,0	0,226	0,667	... ...	S		S W	Clear		Cloudy th. lightning.
23	,966	29,908	,960	82,5	85,0	82,2	0,069	... ...	... ...	S W	S S E	S E	Th.haze	Clear	Clear vivid lightning.
24	30,008	,964	30,024	83,9	84,0	82,2	... ...	... ...	... ...	S W W	S E	S E	Fl. cl.	Th.haze	Fl. cl. th. lightning.
25	,050	30,040	,046	83,7	85,0	82,2	0,217	... ...	2,096	N E	E	N E	Fl. cl.	Clear	Fl. cl. do. do.
26	,062	,040	,050	79,9	81,0	81,0	0,327	0,767	... ...	S W	S W	N W	Cloudy	Cloudy	Cloudy do. do.
27	29,994	29,944	29,952	78,6	78,0	77,0	2,448	0,212	... ...	NbyNW	N	N W	Cloudy	Cloudy	Cloudy do. do.
28	,980	,876	,970	76,5	85,6	78,5	1,530	1,122	... ...	N W	N	N W	Rain	Cloudy	Cloudy do. do,
29	30,002	—	,974	78,5	—	80,0	0,247	... ...	... ...	N W N		N W	Cloudy		Cloudy lightning.
30	,012	29,898	,950	78,8	80,5	79,0	0,437	0,477	... ...	N	N	N W	Rain	Cloudy	Cloudy do.
31	29,914	,694	.901	75,8	76,5	79,5	2,488	2,691	... ...	NwbyN	N	N E	Cloudy	Rain	Cloudy do.
Mean	29,984	29,904	29,959	82,8	84,4	82,0									

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY, FOR THE MONTH OF NOVEMBER 1837.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Thermometer at 10 A. M.	Thermometer at 4 P. M.	Thermometer at 10 P. M.	Rain. Sun rise.	Rain. Sun set.	Evaporation.	Direction of Wind. 10 A. M.	Direction of Wind. 4 P. M.	Direction of Wind. 10 P. M.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.
1837	Inch.	Inch	Inch.	°	°	°	In.	In.	In.						
Nov. 1	29,898	29,788	29,876	80,6	79,8	79,4	1,981	0,567	2,128	S E	S E	E	Fl. Cl.	Cloudy	Cloudy lightning.
2	,896	,808	,902	79,3	80,3	79,5	0,580	... ...	... ...	N E	N E		Cloudy	Cloudy	Do. do. str. wd. night.
3	,902	,816	,855	76,5	75,3	75,0	2,948	1,074	... ...	N E	N		Rain	Rain	Do. do. day time.
4	,832	,784	,800	76,0	75,2	74,7	0,077	0,672	... ...	W	W		Cloudy	Rain	Cloudy lighining.
5	,854	—	,856	77,8	—	75,0	0,367	... ...	... ...	S E	—	—	Fl. Cl.	—	Distant thun. and lightg.
6	,888	29,808	,895	79,7	81,7	74,1	0,360	0,137	... ...	S E	S E		Cloudy	Cloudy	do. do.
7	,940	,872	—	82,7	80,0	—	... ...	... ...	... ...	—	S E		—	Cloudy	Loud do. and vivid do.
8	,966	,876	29,938	80,9	80,4	75,6	0,507	... ...	1,403	N W	E		Cloudy	Cloudy	Lightning.
9	,976	,902	,950	81,0	82,0	75,0	0,337	... ...	... ...	N	E		Cloudy	Th. haze	do.
10	,950	,876	,916	80,9	80,0	79,2	... ...	... ...	... ...	N	N E	W	Cloudy	Cloudy	Fl. Cl. do. [heavy rain.
11	,926	,816	,875	80,5	83,0	78,5	... ...	... ...	... ...	S W	S SE		Cloudy	Cloudy	Cl. loud thr. & vivid ltg.
12	,932	—	,920	79,7	—	79,9	2,843	... ...	......	S E	—	S E	Cloudy	—	Fl. Cl. light. [7 P. M. lg.
13	,986	29,940	,990	80,3	82,0	80,0	0,030	... ...	... ...	S W	E	N	Fl. Cl.	Th. haze	Th. haze rainbow to ☽ at
14	30,022	,960	30,012	79,8	80,5	79,7	... ...	1,534	... ...	N W	N E	N E	Rain th.	Cloudy	Clear thun. and lg. dew.
15	,002	,964	29,988	80,8	82,0	79,1	... ...	... ...	1,284	N E	N E	N	Cloudy	Fl. Cl.	Fl. Cl. lightning.
16	,010	,940	,992	80,1	81,8	79,3	... ...	0,094	... ...	N	N W	N W	Cloudy	Cloudy	Haze do.
17	,026	—	30,038	80,3	—	77,9	... ...	... ..	... ...	N	—	N	Do. thr.	—	Clear do. dew.
18	,060	29,980	,052	80,1	0,0	79,7	... ...	... ...	... ...	N W	N	N E	Fl. Cl.	Do. thr.	Fl. Cl. do.
19	,068	—	—	80,4	—	—	0,067	0,230	... ...	N	—	—	Fl. Cl.	—	— do.
20	,080	29,988	30,040	82,1	82,0	80,5	... ...	... ...	... ...	E	N E	N E	Fl. Cl.	Cloudy	Clear do.
21	,060	,984	,032	81,8	82,8	80,7	0,317	... ...	... ...	E	E	E	Fl. Cl.	Clear	Fl. Cl. do. dist. thr.
22	,062	30,012	,048	77,1	76,7	80,2	1,069	1,375	1,235	N W	N W		Cloudy	Cloudy	— do.
23	,022	,020	,082	80,0	81,4	78,8	... ...	... ...	... ...	N E	N E	N E	Clear	Fl. Cl.	Fl. Cl. do.
24	,088	,040	,092	79,5	81,0	78,2	... ...	... ...	... ...	N E	N E	N E	Clear	Clear	Clear dew and cold.
25	,026	,032	,076	80,0	81,0	78,3	... ...	... ...	... ...	N E	N E	N	Fl. Cl.	Fl. Cl.	Fl. Cl. do. do.
26	,076	—	,034	79,6	—	78,1	... ...	... ...	... ...	N	—	N E	Clear	—	Clear do. do.
27	,058	29,980	,034	77,8	80,0	76,3	... ...	... ...	... ...	N E	N E	N E	Fl. Cl.	Fl. Cl.	Do. do. do.
28	,072	,988	,058	78,0	79,0	75,8	......	... ...	... ...	N	N E	N	Fl. Cl.	Fl. Cl.	Fl. Cl. do. do.
29	,108	30,040	,086	77,8	80,0	77,7	... ...	... ..	2,045	N	N NE	N	Clear	Cloudy	Cloudy do.
30	,108	,046	,088	78,2	80,0	76,0	... ...	... ...	... ...	N	N NE	N	Fl. Cl.	Cloudy	Th. haze do.
Mean	29,997	29,930	29,983	79,6	0,3	77,9									

METEOROLOGICAL REGISTER KEPT AT THE MADRAS OBSERVATORY, FOR THE MONTH OF DECEMBER 1837.

Days.	Barometer at 10 A. M.	Barometer at 4 P. M.	Barometer at 10 P. M.	Thermometer at 10 A. M.	Thermometer at 4 P. M.	Thermometer at 10 P. M.	Rain. Sun rise.	Rain. Sun set.	Evaporation.	Direction of Wind. 10 A. M.	Direction of Wind. 4 P. M.	Direction of Wind. 10 P. M.	Weather. 10 A. M.	Weather. 4 P. M.	Weather. 10 P. M.
1837	Inch.	Inch.	Inch.	°	°	°	In.	In.	In.						
Dec. 1	30,084	30,012	30,058	77,3	79,8	75,0	... ...	... ...	... ...	N	N E	N	Fl. Cl.	Cloudy	Clear lightning.
2	,070	,020	,049	77,9	79,5	74,8	... ...	... ...	... ...	N	N E	—	Fl. Cl.	Cloudy	do.
3	,084	,024	,062	74,0	79,5	76,6	... ...	0,944	... ...	N	N E	N E	Cloudy	Cloudy	Fl. cl. do.
4	,064	,020	,042	72,0	73,6	75,7	... ...	0,597	... ...	N E	N E	N	Cloudy	Rain	Cloudy do.
5	,032	29,992	,022	74,2	77,0	76,2	0,489	... ...	... ...	N	N	N	Cloudy	Cloudy	Cloudy do. }
6	,038	,956	,022	72,7	75,6	74,8	0,067	0,167	2,377	N	N	N	Cloudy	Rain	Do. do. { Strong
7	29,996	,944	29,981	72,6	75,0	74,3	0,200	0,167	... ...	N W	N	NbNW	Dr. rain	Cloudy	Do. do. { wind.
8	,970	,866	,940	72,4	74,0	74,2	0,147	... ...	... ...	NWbN	N NW	NbNW	Cloudy	Cloudy	Do. do. }
9	,962	,950	,972	73,0	75,5	74,3	... ...	... ...	... ...	N W	N W	N W	Cloudy	Cloudy	Cloudy strong wind.
10	30,004	,937	30,022	71,8	74,5	74,8	... ...	... ...	... ...	NWbN	N W	W	Cloudy	Cloudy	Do. do. at day time
11	,048	—	,050	75,8	—	76,2	... ...	... ...	... ...	W	—	S	Th.haze	—	Do.
12	,076	30,050	,066	77,7	79,5	78,2	... ...	... ...	... ...	S W	S E	S	Cloudy	Cloudy	Do.
13	,110	,060	,114	78,5	78,5	77,9	0,048	... ...	1,649	E	S E	E	Cloudy	Cloudy	Do.
14	,148	,094	,144	79,7	83,0	76,3	... ...	... ...	... ...	N E	E	E	Clear	Clear	Clear dew.
15	,148	,064	,104	81,3	84,0	80,3	... ...	... ...	... ...	N E	E	N	Fl. Cl.	Clear	Fl. cl. do.
16	,126	,068	,118	79,7	84,0	79,0	... ...	... ...	... ...	N	N E	N	Fl. Cl.	Clear	Clear do.
17	,140	—	,138	80,3	—	78,8	... ...	... ...	... ...	N W	—	N E	Fl. Cl.	—	Fl. cl. do.
18	,198	30,124	,162	81,9	84,5	78,3	... ...	... ...	... ...	W	E	N E	Fl. Cl.	Clear	Clear do.
19	,204	,142	,178	81,8	83,6	78,3	... ...	... ...	. ...	N	N	N E	Clear	Clear	Clear do. [wind.
20	,178	,108	,172	81,7	82,0	77,4	... ...	... ...	1,810	N E	N E	N NE	Clear	Fl. cl.	Fl. cl. do. moderate
21	,200	,109	,168	79,8	79,8	76,9	... ...	... ...	... ...	N NE	N E	N E	Fl. Cl.	Fl. cl.	Cl. stg. wind day&night.
22	,188	,088	,198	78,5	74,0	75,9	... ...	... ...	... ...	N NE	N NE	N NE	Cloudy	Cl.dr.rn	Dr. rain do. do. only at
23	,160	,084	,148	76,3	78,0	76,3	0,442	0,187	... ...	N	N E	N	Cloudy	Cloudy	Haze. [day time.
24	,152	,050	,130	80,0	78,0	76.3	... ...	... ...	... ...	N E	N E	N E	Fl. Cl.	Fl. cl.	Cloudy lightning.
25	,170	,054	,122	80,7	81,6	76,2	0,037	... ...	... ...	N	N E	N E	Fl. Cl.	Fl. cl.	Clear do. dew.
26	,148	,060	,128	79,9	81,4	77,3	... ...	... ...	... ...	N NE	N NE	N	Fl. Cl.	Fl. cl.	Fl. cl. do. do.
27	,132	,054	,134	79,9	81,4	76,8	... ...	... ...	2,320	N NE	N NE	N E	Fl. Cl.	Fl. cl.	Fl. cl. do.
28	,168	,056	,142	79,7	81,8	76,3	... ...	... ...	... ...	N NE	N NE	N E	Fl. Cl.	Clear	Clear dew and cold.
29	,166	,056	,104	78,3	80,2	73,4	... ...	... ...	... ...	N	N E	N	Fl. Cl.	Fl. cl.	Clear do. do.
30	,152	,050	,078	76,4	80,2	71,2	... ...	... ...	... ...	N	N	N	Fl. Cl.	Th.haze	Haze.
31	—	—	,098	—	—	71,8	... ...	... ...	... ...			N			Clear do. do.
Mean	30,111	30,039	30,093	77,6	79,3	76 2									

The Instruments with which the foregoing Observations are made, are placed in the Western Verandah of the Honorable Company's Observatory, at about 5 feet above the surface of the ground, and 27 feet above the level of the Sea; the Thermometer was made on purpose for the Observatory, and at 75 (the only point at which a comparison has been made) it was found to differ insensibly from the Royal Society's Standard;—the Barometer is one of two Standards which I have lately constructed, and may be depended upon to 0,01 of an inch.

	h.	*m.*	*s.*	
Longitude....	5	21	8	E.
Latitude......	13°	4′	8″,5	N.

MADRAS OBSERVATORY,
1*st January*, 1838.

T. G. TAYLOR,
H. C. Astronomer.